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Thesis

MECHANICAL SOUND-REPRODUCING DEVICES:
THEIR USE IN MUSIC AND EDUCATION

Submitted by

Ruth Eleanor Bailey
(B.M., New England Conservatory of Music, 1930)

In partial fulfillment of the requirements for the
degree of Master of Education

1932

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TABLE OF CONTENTS

	Page
Introduction	1
EARLY MECHANICAL EXPERIMENTS	2
MAJOR INSTRUMENTS	6
PHOTOGRAPHY	9
General Development, and the United States	10
Electrical Recording	17
Foreign Photographic Development	25
Unofficial Use of the E. A. Tamm	34
Conclusion	41
INDEX	42
General History	40
UNITED STATES	44
Development	44
Network Programs	46
Types of Programs	47
Education	51
Schools of the Air	57
On the networks	60
Net Programs	63
Music	66
Schedules	69
OTHER NORTH AMERICAN COUNTRIES	74
Canada	74
Mexico	74
Costa Rica	74
Laos	75

TABLE OF CONTENTS

	Page
Introduction	1
EARLY MECHANICAL EXPERIMENTS	2
PLAYER INSTRUMENTS	6
PHONOGRAPH	9
General Development, and the United States	9
Electrical Recording	17
Foreign Phonograph Development	26
Educational Use of the Phonograph	34
Conclusion	41
RADIO	42
General History	42
UNITED STATES	44
Development	44
Network Programs	46
Types of Programs	49
Education	51
Schools of the Air	57
On the networks	59
Net Programs	63
Music	66
Schedules	69
OTHER NORTH AMERICAN COUNTRIES	74
Foreword	74
Mexico	74
Cuba	74
Canada	75

TABLE OF CONTENTS

Page

1	Introduction
2	EARLY MECHANICAL EXPERIMENTS
6	PLAYER INSTRUMENTS
9	PHONOGRAPH
9	General Development, and the United States
17	Electrical Recording
26	Foreign Phonograph Development
34	Domestic Use of the Phonograph
41	Conclusion
42	RADIO
42	General History
44	UNITED STATES
44	Development
46	Network Programs
49	Types of Programs
51	Education
57	Schools of the Air
59	On the networks
63	Net Programs
66	Music
69	Schools
74	OTHER NORTH AMERICAN COUNTRIES
74	Canada
74	Mexico
74	Cuba
75	Index

Table of Contents, continued

Radio, continued

EUROPE	---	---	---	---	---	---	76
Introduction	--	--	--	--	--	--	76
GREAT BRITAIN	--	--	--	--	--	-	77
General History	---	---	---	---	---	-	77
Education	--	--	--	--	--	--	80
Music	--	--	--	--	--	--	81
GERMANY	--	--	--	--	--	--	86
AUSTRIA	--	--	--	--	--	--	88
HUNGARY	--	--	--	--	--	--	88
HOLLAND	--	--	--	--	--	--	88
DENMARK	--	--	--	--	--	--	89
FRANCE	--	--	--	--	--	--	89
RUSSIA	--	--	--	--	--	--	90
ITALY	--	--	--	--	--	--	90
Other Nations	--	--	--	--	--	--	90
OTHER CONTINENTS	--	--	--	--	--	--	92
SOUTH AMERICA	--	--	--	--	--	--	92
ASIA	--	--	--	--	--	--	93
Japan	--	--	--	--	--	--	93
Other nations	--	--	--	--	--	--	93
AFRICA	--	--	--	--	--	--	94
OCEANIA	--	--	--	--	--	--	94
INTERNATIONAL ASPECTS	--	--	--	--	--	--	95
General Conclusions	--	--	--	--	--	--	95
Summary of World Radio	--	--	--	--	--	--	97

Table of Contents, continued

ELECTRICAL TRANSCRIPTIONS	--	--	--	--	--	--	98
Introduction	--	--	--	--	--	--	98
Electrical Instruments	--	--	--	--	--	--	98
Electrical Recordings	--	--	--	--	--	--	100
New Tone Colors	--	--	--	--	--	--	101
Facsimile Broadcasting	--	--	--	--	--	--	102
SOUND MOTION PICTURES	--	--	--	--	--	--	103
General Development	--	--	--	--	--	--	103
Educational Use in U.S.	--	--	--	--	--	--	113
Foreign Educational Use	--	--	--	--	--	--	115
German Sound Films	--	--	--	--	--	--	116
Conclusion	--	--	--	--	--	--	117
TELEVISION, RADIOVISION, RADIOMOVIES	--	--	--	--	--	--	118
GENERAL CONCLUSION	--	--	--	--	--	--	122
APPENDICES:							
A: Mergers	--	--	--	--	--	--	123
B: Distribution of Radio Sets in U.S.	--	--	--	--	--	--	126
C: Summary of World Radio Stations and Sets	--	--	--	--	--	--	129
BIBLIOGRAPHY	--	--	--	--	--	--	137

Table of contents, continued

98	--- --	ALPHABETICAL TRANSCRIPTIONS
98	--- --	Introduction
98	--- --	Electrical instruments
100	--- --	Electrical recordings
101	--- --	New tone colors
102	--- --	Facsimile broadcasting
103	--- --	SOUND MOTION PICTURES
103	--- --	General development
113	--- --	Adaptational use in U.S.
115	--- --	Foreign adaptational use
116	--- --	German sound films
117	--- --	Conclusion
118	--- --	TELEVISION, RADIOVISION, RADIOMOVIES
122	--- --	GENERAL CONCLUSION
APPENDICES:		
123	--- --	A: Mergers
126	--- --	B: Distribution of radio sets in U.S.
129	--- --	C: Summary of world radio stations and sets
137	--- --	BIBLIOGRAPHY

INTRODUCTION

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One of the most salient obstacles to a universal enjoyment of Music has been its illusive, its intangible quality. But with the advent of certain types of mechanical reproduction, sound was given perpetuity - a permanent form at the command of all who wished musical experience. The various kinds of player actions and the phonograph are capable of giving a sound-performance that has been recorded at some earlier date.

Another type of mechanical reproduction affords instant reception of a performance which is merely "out of sight". The Radio is the best example.

Later developments have added to each of the above classes a union of sight and sound. In Sound Motion Pictures there is a permanent film and sound accompaniment. In Television, Radiovision, Radiomovies, there is simultaneous electrical transmission and reproduction of image and sound.

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EARLY MECHANICAL EXPERIMENTS

All developments in sound recording and sound reproduction have been dependent upon the work of physical scientists.

History records several interesting ventures into mechanical action which antedate the types of players in popular use to-day.

Reveries Dictionary cites the Carillone as one of the first mechanisms; they were numerous in Europe as early as the fifteenth century, and in their later development of the following centuries were played from manuals.

EARLY MECHANICAL EXPERIMENTS

Among mechanisms operated by other than manual means, we note the Barrel Organ. One of these was invented in the fifteenth century in Holland by A. van der Linde; a later model from the same country was designed by Solomon de Cass. The eighteenth century inventions were played by the turning of a handle which in its turn operated a roll or drum of tunes.

There were several kinds of Barrel Organ. A Music Box, made chiefly in France and in Switzerland, played about twelve tunes. An American invention - the Regina - used flat discs, one tune to a disc, but with a purchase price small enough to encourage sales, a procedure that is suggestive of the phonograph industry. Other instruments included Organettes, Angelicas, Orchestrons, Hand Organs, Celestines, and Hurdy-gurdies - all of the roll

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Most of these instruments had an inflexible repertoire; one tune was played after another in monotonous succession. While additional rolls of from one to twelve tunes could be purchased, expense was great and the process of change awkward.

For a time inventions that were to lead to the phonograph paralleled those which were to reveal the player action.

As early as the seventeen hundreds, Duhamel had foreshadowed the phonograph by tracing sound curves upon a lamp-black revolving cylinder. Similar experiments were carried on by his contemporaries.

Maelzel was an early inventor of automatic musical devices. In 1792 at Vienna, he constructed "an automaton instrument of flutes, trumpets, drums, cymbals, triangle, and strings struck by hammers, which played music by Haydn, Mozart and Crescentini."* Another of his inventions was a Panharmonicon which closely resembled the former, but with clarinets and strings added. This was exhibited in Vienna in 1804. It was for this instrument that Beethoven composed his work commemorating the battle of Vittoria, June 21, 1813. (It was later scored

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The pianoforte, as invented by Cristofori in 1720, was the foundation for all keyboard player-actions.

In 1910, Friedrich Kaufmann, a celebrated musical instrument dealer in Dresden, invented the Harmonichord. Groves Dictionary gives an interesting account of it:

"In its form it resembled a small square piano; but the sound was obtained not by striking the wires with hammers, but by the friction against them of a revolving cylinder (as in the ordinary hurdy-gurdy), covered with leather, and rosined. This cylinder, which in the effect it produced somewhat resembled the bow of a violin, was set in motion by a pedal worked by the foot of the player. All gradations of tone, as well as the power of swelling or diminishing the sound upon a sustained note, were produced by the pressure of the finger."**

In 1811, Weber wrote for it an interesting Adagio and Rondo with orchestral accompaniment. He wrote concerning this piece of music:

"It was an infernal piece of work to write for an instrument whose tone is so peculiar and strange that one has to

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In 1827, Carreyre invented a Melographic Piano "in which the music as played was represented by certain signs impressed in a very thin plate of lead." **

Nine years later, Eisenmanger, a Parisian scientist, obtained an English patent for an apparatus which recorded piano music by using a depressed stylus and carbonized paper.

In 1850, Debain*** with several preliminary experiments to his credit, invented a piano mechanique, a crank version with the hammers controlled by levers instead of the fingers.

In 1851, Kauffmann, whose name is remembered for his development of the organ, invented an instrument that sounded like a wind orchestra with kettledrums. Patti owned such an instrument - reputed to have a repertoire of fifty-two operatic selections.

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** "The Phonograph and How to use it" - National Phonograph Co., Page 181,

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PLAYER INSTRUMENTS

The fundamental idea for the player piano dates back about 200 years, but real development has only come within the last twenty-five.

One of the first inventions which seemed to lead directly to the player piano was by Jean Varlet, of France; in 1844 he designed the mechanism for an automatic playing piano.

Not until 1890 was there a keyboard player in the United States, when E. D. Foster invented one.

Foster's device of 1890 actuated the keys of the piano - a real forerunner of the piano-player action.

PLAYER INSTRUMENTS

Not until 1893 was his invention displayed on American markets.

From 1898 - 1908 was an extremely active period for inventors. About fifty patents were registered in the United States.

The first automatic piano-player that was put on the market was invented by Edward M. White, of Chicago, in 1897, under the name of the "Angelus", and was closely followed by the "Pianola".

The Pianola in its earliest form was an instrument with a detachable mechanism, i.e., the automatic device could be used or not as the owner wished. A later form combined piano and player-action in one case.

William A. Frederick's "The King of Instruments" is a book on this subject. (See 301).

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As early as 1900, Welte reproducing actions were introduced to England through Steinway and Sons, in whose pianos the action was placed.

After the war, Aeolian Duo-Art came out with an invention which eliminated pedaling, substituting motor power. In the early 1920's, manufacturers of the player-piano claimed to "reproduce the actual performance of artists who have played upon it."*

Almost every company began to apply certain piano-player actions to its own pianos. From 1903 to 1923, mechanical pianos were being technically perfected. It was a period for educational propaganda.

In 1914 there was an estimate of about 6,000,000 pianos and piano-players in use in the United States, and there were about 100 factories producing player-actions.**

*Catalog: Aeolian Hall (Educational Dept.), P 13.

**Van Atta, Harrison Louis: A Treatise on the Player Piano, P 151.

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**Van Atta, Harrison Lewis: A Treatise on the Player Piano, P. 151.
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The development of the player piano was parallel to that of the phonograph and somewhat overshadowed by it. Both the radio and phonograph forced the player piano to a more artistic work.

Its latest development is the Audiographic Music roll which contains (along with the perforations) complete biographical sketches, pictures, comments on form, climax, tone, style, modulations. It is designed to be educational as well as entertaining.

However, the cost of the instruments and of the necessary rolls - especially in the perfected forms of later years - has been prohibitive to most educational institutions.

Modern composers have shown some interest in this mechanical medium. Stravinsky included a handorgan in Petroushka. A young German group, Hindemith, Toch, Münch, has written compositions for the mechanical piano.*

It is generally conceded that the market for player actions has fallen to other fields of mechanical devices. But it served as an admirable preparation for sound reproducing instruments to come.

*Coeuroy, André: Panorama de la musique contemporaine, P 163.

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PHONOGRAPH

About the first mention of a talking apparatus was in the thirteenth century when Roger Bacon was reputed to have made a talking machine which could speak a few words. Various freak automata were attempted; some were meant to enhance mystery in ceremonies.

A real step toward the talking machine was made when Leon Scott, aided by Dr. Rudolph Koenig, invented, in 1856, a phonograph, an instrument that closely resembled the first PHONOGRAPH.

Phillip Reis, in 1861, invented an electrical device which served to carry a tone or a voice over wire, but his General Developments were of quality.

Two years Electrical Recording, Edison, patented an electrical Foreign Development, but the invention was so used for Educational Use machines were made for sale. However, no Conclusion (note the name phonograph).

Two men may be said to be responsible for the final invention of the phonograph - M. Charles Cros, who in 1877 deposited at the Academie des Sciences in

* A celebrated acoustical engineer, a German living in France, author of the famous 'Quelques Experiences d'Acoustique'; he ranks second only to Helmholtz in the field of sound.

** Son of a German baker; he had hoped to invent a telephone, but never could overcome the quality handicap in his machine. His invention was used as a rival to Bell's at a later period.

PHILIPPINES

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Electrical Engineering

Foreign Development

Education

Construction

Paris a description PHONOGRAPH similar to the present

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Two years later, a young scientist, Fenby, patented an electromagnetic phonograph, but the invention was so complicated that no machines were made for sale. However, he did contribute the name phonograph.

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*** A German, living in Washington, responsible also for development of the telephone transmitter, which in turn inspired the invention of the microphone.

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** Son of a German baker; he had hoped to invent a telephone, but never could overcome the quality handicap in his machine. His invention was used as a rival to Bell's at a later period.

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Also in 1877 came Edison's patent for his invention of the tin-foil cylinder phonograph - the ancestor of all development in the United States. Edison himself tells of the sketch he presented for his idea, its mechanical construction by Kruesi (an employee in his factory), his shouting of "Mary had a little lamb" into the horn of the little machine, and his surprise when the contraption echoed his words.*

These instruments in their first practical usage were adapted for the speaking voice - for office work, dictation. Only further experimentation proved that music might be a profitable branch of reproduction.

Edison, in the early days of this instrument, recorded the speaking voices of all the celebrities that he could reach in various nations. Some of these early recordings are now at the British Museum.

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In 1889 the Columbia Phonograph Company was established in Washington, D.C. (a descendent of the Volta Company). Its first records were almost exclusively for band and orchestra; solo voices had little sales value.

Columbia began as one of about thirty small local companies, "each having its own allotted territory, under franchise from the North American Phonograph Company which held the exclusive selling rights."* Six months after the company was formed, it was manufacturing records. It put out some 'nickel-in-the-slot-machines' in this early period of growth, the band records proving most popular.

The next step was to solicit artists for recording material. Records as a rule were not labeled, but were announced by a voice at the beginning of the record as to artist, title, and producing company.

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The first Berliner records were in seven-inch size: a few of the 1896 records are in private collections. Many of the 1899 and 1900 recordings are in existence.

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About this time there was a more serious inspection of the music field by the existing companies. Solo voices were brought out. Columbia introduced some chamber music played by the London String Quartet. Commercial concentration, better programs, more accurate reproduction - all these combined to enlarge the sales horizon of records and talking machines. Quality of the records varied. While Europe probably produced the better grade, import duties were high, and the prohibitive prices gave to domestic records a greater value and demand.

About 1902, electro-plating brought about the use of a master disc from which many records could be secured. Previously, all records had been originals. In this same year compromises affecting the patents of Bell, Berliner, and Edison were made, and wax became the general basis of records.

In 1902 Caruso became one of the first of the great artists to record solos. Between 1902-04 many others were induced to make records.

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Also at this time the Talking Machine News, a London publication devoted to gramophone news and record reviews was issued.

In 1904 the German firm, C. and J. Ullmann, produced and distributed the first double-faced discs, called the "Odeon Duplex".

By 1905, with all these improvements, and with a concentrated program of advertising, Victor was doing about twelve million dollars' worth of business. This same year Edison machines and records played a prominent part in the market; and Columbia was producing for a Chicago premium house the popular "Busy Been Talking Machine."

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From 1908 on, technical matters concerned the companies. Duplex announced a two-horned machine in an attempt to get better reproduction, but the venture was unsuccessful.

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In 1910 Columbia began advertising on a large scale in direct competition with Victor which had had the American field rather exclusively "sold" to its products.

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One of the first orchestras of national reputation to record for Victor was the Philadelphia Symphony under the direction of Stokowski. At first he produced only the semi-classics. Soon there was a demand for some cut versions of substantial classics, but some years passed before a complete movement of a Symphony was presented to the public.

In April 1915, Kreisler, Zimbalist and a string quartet presented the first complete chamber work - the Bach double concerto.

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In 1920 the phonograph industry had been estimated as having a public patronage of \$150,000,000 and it was noted that phonographs had found entrance to about 9,000,000 homes. Even in this period, people in general refused to seek the serious side of the phonograph. Only the schools seemed to discover the good use to which it could be put.

In June 1923 the first complete string quartet appeared - the Brahms Op. 51, #1.

This same year Victor alone reported a business of \$44,000,000.

In November 1924, Columbia Phonograph Company began the Masterwork series of classics, in albums, complete, the first issue including five symphonies (Beethoven's Seventh, and Eighth; Dvorak's "From the New World" Symphony; Mozart's E-flat major, #39; Tschaikowsky's Pathetique), and three string quartets (Haydn's D major, Op. 76, #5; Mozart's C major, Köchel 465; Beethoven's C-sharp minor, Op. 131). These were inaugurated under Louis Sterling (former chairman of the Board of International Columbia Company), who has also given much attention to contemporary music.

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Not until 1925 did the phonograph companies release any quantity of complete symphonies and quartets. This was, however, a year of depression for the industry. There were rumors of impending revolutionary processes of recording, and the radio had seized upon the public attention as a rival. Indeed it has been said that "until the radio came to terrify record manufacturers, actual phonographic treasures were disconcertingly rare."*

The radio had two advantages over the phonograph: it gave a continuous performance, and did away with the necessity of buying records which were not only fragile and easily broken, but gave no better quality of tone.

The phonograph industry sought an answer to both of these arguments. In 1926 it did regain part of its lost popularity with a new recording scheme.

ELECTRICAL RECORDING

Until this new scheme was employed, all recording had been done by the mechanical, or as it is sometimes called, the acoustical method which "consisted essentially in: first, a horn which received the sound waves to be recorded; second, a diaphragm which was vibrated by the sound waves; third, a stylus attached

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The new method of electrical recording owed its inspiration in no small degree to certain radio developments. There are two types. Brunswick uses a "light ray method", which synchronizes recording and reproducing through the use of electric current. This invention was marketed as the Panatrope (meaning, 'dancing beam of light'): it gathered in vibrations ranging from 16 - 21,000, and even beyond audibility. Other companies use a microphone to pick up vibrations and sound waves - much as the broadcasting studio does: but the phonograph is able to retain whatever sounds on its recording device. Victor marketed its machine as the Orthophonic. Columbia called its machine the Viva-tone.

Naturally there was chaos in the industry, for many of the old acoustical records were discarded: some were retained because of intrinsic worth: others were re-recorded.

One of the first electrical recordings to be given to the public was a Columbia release - Adeste Fideles - sung by the Glee Clubs of America numbering 4800 voices.

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In two years, Columbia released about forty major works in this new recording medium. Victor had nearly replaced the acoustical Masterpiece albums.

In 1928, in response to the enthusiastic public demand for albums, Victor announced a policy which would pledge her to the recording of all the major opus numbers of the great composers. Not only is Victor accomplishing this task, but it is adding many contemporary works to the list.

From 1928 to the present time, the three main fields of sound entertainment - Phonograph, Radio, and the new Sound Motion Pictures - interchanged their patents and research developments by mergers and by contracts. Brunswick became an outlet for the German Odeon records. Columbia merged with Berlin Homophon.

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The Phonograph Monthly Review, a periodical devoted to the best interest of the people and including articles of a technical nature as well as upon current record releases, had been issued since October 1926. Mr. Robert Darrell, one of its associates, has to say of the 1929 records:

"Previously the phonograph had touched gingerly and sporadically on the less familiar musical regions (when it ventured off the well-worn paths at all), but this year tentative experiments were abandoned for intelligent - I might almost say scientific - explorations of what had been in earlier years phono-musical dark continents.

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petent exponents. The national schools, particularly that of Spain, and to a lesser degree those of France and Russia were excellently represented. Operas and large choral works running into many discs were no longer rare and astonishing, but an every-month occurrence. The tide of war-horse recordings abated in marked fashion, and attention turned to the less familiar works of the great composers as well as to the works of lesser men. Chamber music in all its forms flourished on discs as it has hardly flourished even in the concert hall, and the additions of its recorded literature were alone sufficient to mark 1929 as a year of unparalleled musical - as well as purely phonographic - advance."*

In the summer of 1930, a merger between Brunswick and Warner Brothers (Vitaphone) was announced.

This same year, radio station KGW of Portland, Oregon, (an associate of the NBC chain) reported that for local sustaining programs some of the Masterpiece albums had been put 'on the air' with favourable response from the listeners. Without doubt these broadcasts offered a much better type of music than was found on the majority of the chain sponsored programs.

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The greatest single feature of 1931 was the advent of the long-playing record, the phonograph's latest answer to radio's invasion of the entertainment field. In September these new records, and, of course, the necessary instruments were demonstrated for public use. (Agitation and various rumors had preceded this invention since 1929). The new device changed the number of revolutions per minute from seventy-eight to thirty-three and one-third: it also increased the number of grooves on the playing surface. It was now possible to record a complete symphony on a single, double-faced record. A few works of the serious music type were immediately presented to the public.

Although some companies sold attachments that would convert the old machines for use of the new records, there was an immediate depression in record sales following the announcement of this latest invention. The public was uncertain of the balance of long or short-time records to be released by the phonograph companies.

That this was merely an experiment, and that the executives of the industry clearly understood the public was made evident in an open letter to the editor of the Phonograph Monthly Review, written by H.C. Cox, President

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of the Columbia Phonograph Company. He says, in part:

"There are approximately fifteen million phonographs and combination radio-phonographs in American homes, and all of them are fitted with motors, turntables, tonearms, and other equipment for using the standard speed record.

"By far the greater sale of records, now and for many years past and to come, has been and will be of selections, vocal and instrumental in the popular classes: dance music; light and tuneful compositions; standard songs and ballads; old time melodies and familiar tunes; and race and national folk songs, both domestic and in foreign languages - which do not lend themselves to long playing or repetition. Selections in these classes will continue to be in greatest demand and must be in such form that users may select the titles they want, without having to take and pay for others they do not want.

"The long-playing record, whatever its ultimate development may be, is not yet commercially practicable or a serious rival of the standard speed record."*

But those who prefer the more serious type of music will welcome the convenience of the new records.

In spite of this innovation which was expected to bring new life to the phonograph industry, we find tendencies to merge to attract wider sales, and new fields of work. "Brunswick, Vocalian, and Melotone records, which had once been a product of the Brunswick-Balke-Collender Company, but more recently of the Brunswick Radio Corporation (a Warner Brothers subsidiary) have now

* Phonograph Monthly Review: January 1932, P 72.

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"There are approximately fifteen million phonographs and combinations of radio-phonographs in American homes, and all of them are fitted with motors, turntables, tonearms, and other equipment for using the standard speed record.

"By far the greater sale of records, now and for many years past and to come, has been and will be of selections, vocal and instrumental in the popular classes: dance music; light and tuneful compositions; standards, songs and ballads; old time melodies and familiar tunes; and race and national folk songs, both domestic and in foreign languages - which do not lend themselves to long playing or repetition. Selections in these classes will continue to be in greatest demand and must be in such form that users may select the titles they want, without having to take and pay for others they do not want.

"The long-playing record, whatever its ultimate development may be, is not yet commercially practicable or a serious rival of the standard speed record."

But those who prefer the more serious type of music will welcome the convenience of the new records. In spite of this innovation which was expected to bring new life to the phonograph industry, we find tendencies to merge to attract wider sales, and new fields of work. "Brunswick, Vocalion, and Melotone records, which had once been a product of the Brunswick-Balke-Whitcomb Company, but more recently of the Brunswick Radio Corporation (a Warner Brothers subsidiary) have now

* Phonograph Monthly Review: January 1932, p. 72.

passed to a new Brunswick Record Corporation, formed by Consolidated Films Industries, Inc."*

The following news comes from an English publication; the Gramophone:

"Thrown on its own by the combine effected between the British Columbia and HMV., the American Columbia Phonograph Company has not had very easy sledding during the past six months. Few large scale recordings have been attempted and Columbia branches have taken up the distribution of such extra-musical attractions as electrical refrigerators, home dry cleaners, and the like, in addition to various radio lines other than Columbia's own. Apparently no large company can exist by the phonograph alone in the United States in these days. Now Columbia's future looks more hopeful with the news that it has been acquired by the Grigsby-Grunow Company, maker of Majestic radios and refrigerators."***

Similar forebodings were voiced in lighter vein by Myron Garrett, also writing for the Gramophone:

"One queries where those mythical hordes so eloquently promised by the schools and conservatories really hang out. Our chief radio dervish, Mr. Walter Damrosch, has apparently been kidding us - and himself.

"From the gramophone business itself comes the gloomiest augury. Time was that a dealer had to fall to his knees and beg for the honour of selling products of the major companies. They went back through his great-grandmother for pedigree, and his character had to be vouched for by his banker, his pastor, and the county sheriff. Nowadays, if he's reckless enough to court disaster

* Gramophone Magazine: February 1932, P 404.

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"Thrown on its own by the combine affected between the British Columbia and N.W., the American Columbia Phonograph Company has not had very easy sailing during the past six months. Few large scale recordings have been released and Columbia phonograms have taken up the distribution of such extra-musical attractions as electrical refrigerators, some dry cleaners, and the like. In addition to various radio lines other than Columbia's own. Apparently no large company can exist by the phonograph alone in the United States in these days. Now Columbia's future looks more hopeful with the news that it has been acquired by the Grigsby-Grumow Company, maker of Westinghouse radios and refrigerators."

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"One queries where those mythical borders so eloquently promised by the schools and conservatories really hang out. Our chief radio darling, Mr. Walter Damrosch, has apparently been kidding us - and himself.

"From the gramophone business itself comes the pleasant surprise. Time was that a dealer had to fall to his knees and beg for the honour of selling products of the major companies. They went back through his great-grandfather for pedigree, and his character had to be vouched for by his banker, his pastor, and the county sheriff. Nowadays, if he's reckless enough to court disaster

* Gramophone Magazine: February 1932, p. 404

** "American", Gramophone, February 1932, p. 404.

he is almost certain to win the doubtful privilege for the mere asking.

" Keeping in mind our 120 millions, who for the past generation have cavorted in Babylonian prosperity, one might expect the land to swarm with manufacturers of discs, machines, appliances. Alas, we have only two great companies and a negligible third. And the celebrity records, for the most part, come from Europe. Thus, in the longest available catalogue of albums, numbering some 130, I could muster a bare half-dozen which were not recorded abroad. The other large producer does better: only about half are of foreign origin. The third concern, barring a few bright flashes, is still in limbo. O yes, there's a fourth, but I don't seem to recall in its meagre menu a single native dish."*

* Garrett, Myron H: "The Gramophone Myth in America", Gramophone, December 1930, P -336.

The following year a Paris branch of the Gramophone Company was organized.

In the first decade of the 1900's, the disc record came into wide use. Edison was the last large company to adopt it. English records sold for very low prices, for Belgian competition forced them to the limit.

An early European company was the firm of Nipper Records, 22 Holborn. Dealers in Swiss music boxes. Their first records were of cardboard, coated with celluloid, sections and rings.

The first Swiss records of 1902 were made at Milan, for a consideration of 100 lire, an outrageous price for the time. In the following year, Galliard made his first

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Phonograph, December 1930, p. 355.

records. FOREIGN PHONOGRAPH DEVELOPMENT

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In 1898, the Berliner patents were sold for English use to William Barry Owen and Trevor Williams, who started the Gramophone Company in London. This is the sister company of the Victor Talking Machine Company in the United States.

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Artist performers received a tidy sum for their efforts. But other recorders were usually paid two shillings for each recording: three recordings - all originals - could be made at one time.

A single day's sale of records of one hundred was phenomenal. (By 1929, record sales reached a daily figure of 100,000).

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Another company appeared in London in 1904 - the British Zonophone Company. A little later, Columbia invaded the English field. In fact, for many years, the United States companies with outlets abroad practically controlled English rights to manufacture.

About 1904, also, the Odeon Duplex record appeared. It was the double-face disc of the Ullmann firm.

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About 1921, Musical Times startled the conservative Londoners by inaugurating a record review column. The Phonograph industry was gaining ground. Other publications soon followed the lead, especially the British Musician, the Musical Standard, and Sackbut.

In 1922, British Columbia became independent, buying itself from the American Columbia Phonograph Company. Three years later, British Columbia bought the American firm! To this combination of factories may be added those located in Paris, Milan, San Sebastian (Spain), Santiago (Chile), Sydney, and Tokio.

In 1923, the English Parlophone Company, an indirect connection of the Columbia branches, began to deal with Odeon, Fonotipia, and Beka records.

This same year, so great had become the enthusiasm for the gramophone that there was started in London a periodical devoted to reproducing music, edited by Compton MacKenzie. This magazine - the Gramophone - has served to weld closer together all lovers of the phonograph music, for not only do reviews and comments on records appear, but there are extended communications from various Phonograph Societies.

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have flourished. Although some cities have ventured such an organization, this sort of gathering has not been generally popular in the United States.

The best known London organization is the National Gramophone Society which was formed in 1924. This society releases its own records, and has been responsible for much of the public attention to the finer types of music. As other organizations formed, gramophone recitals became a usual feature.

Electrical recording appeared almost simultaneously in Europe and in America. Perhaps the first to be shown in Europe was the Panatrope: close coöperation between the Victor and Gramophone Companies, and all branches of the Columbia helped to spread this new feature.

By 1927, excellent recordings were being marketed in Europe, and were finding their way to America in spite of heavy import duties. Among notable contributions were those of the Compagnie Française du Gramophone, especially their orchestral records under the direction of Piero Coppola.

With the appearance of electrical recording, in Europe, the phonograph industry regained its place in the field of 'sound' entertainment - no longer eclipsed by radio.

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More and more, companies of various nations joined in contractual agreements to serve as outlets to foreign records. Brunswick and Deutsche Gramophone Company of Berlin were two industries interested in this venture. Of course, Victor and Columbia had many contacts by their established branches. Columbia in 1928 claimed seventeen such outlets.

A Japanese correspondent of the Phonograph Monthly Review states that there are two large phonograph companies in his country: Nitto Chikuonli Kaisha, and Nippon Chikuonli Kaisha. Native music constitutes the major part of all record releases. In 1928, one of the companies offered to the public a long-playing record, antedating anything of the sort in the western world.

In 1928 there was formed at Rio de Janeiro, Brazil, an "Associacao Brasileira do Phonographo" for the betterment of phonograph music.

Evidence that the Columbia people were interested in the development in sound motion pictures is revealed in their 1929 catalogue of "film accompanying records" - an early means of synchronization. The following year, in both France and England, found the mechanical medium for producing music coming into distinct favor. In 1930 there was an estimate of 2,000,000 phonograph owners in England.

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"for the purpose of establishing an interchange of selected lectures and lecture courses given by scholars of all nations and is in no sense a commercial undertaking."* It was further stated that although various devices would be employed in exchanging these lectures, the gramophone would be the main method.

In the summer of 1930, two publications in South America were inaugurated: the Fonos, organ of the Argentine Fono Club, and Phono-arte, a Rio de Janeiro magazine.

In this same year there appeared in Europe an eight-inch, long-playing record - Solex.

In March 1931, HMV and British Columbia were merged. The Gramophone says:

"The amalgamation in itself took no one by surprise, for it has long been inevitable as a step in the formation of the world trust for entertainment."***

The British Broadcasting Company has for several years given regular broadcasts of records which are considered the best releases. The Year Book of 1928 pays tribute to the phonograph companies, thus:

"The advent of the gramophone has done a great deal for music, particularly since, in recent years, the leading companies have realized their responsibilities and provided a tremendous library of first-rate music at a moderate price. It was the more significant

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because it brought to the fireside, for the first time, music which could previously be heard only by comparatively few people privileged to attend first-rate performance, as by a fine orchestra under a great conductor, or perhaps a unique artist performing once only on a flying visit to this country." *

From Harry L. Anderson we have an intimation that contact with phonograph music may lead to larger concert audiences. He says:

"The glamour of the phonograph has lain very largely in the ability to reproduce the art of the great interpreters for those who have admired them deeply in the flesh, or by repute. But no less remarkable is the part the phonograph plays in spreading the work of such artists beyond the bound, where their visits, or their fame, have reached - a function that brings to mind the extent to which sound-recording, and sound-reproducing devices have had effect on the creating of reputations." **

Few of us realize that the phonograph has reached into far-away places. An interesting account of its presence in South Africa is given by Murray Stuart. In large towns of the Union of South Africa there are well equipped phonograph salons. In small villages, records are sold as a side line in department, and even in grocery stores. Victor and Columbia records are the most popular. Concerning the natives, Mr. Stuart says:

"Mechanical reproduction is beginning to interest the native

* BBC Year Book, 1928, P 84.

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who for so long has been content to listen to his master's machine, or to those played in shops. He now wishes to possess an instrument himself, and already is making enquiries about the price. The portable is the one he fancies, for he can carry this to his native kraal."*

The Machines Parlantes et Radio, in December 1929, published an interesting report of the production of gramophones and records of the four principal phonograph countries for 1920 and 1928.**

	<u>Gramophones</u>	
	<u>1920</u>	<u>1928</u>
United States	\$239,110,000	\$1,909,780,000
England	188,670,000	1,238,140,000
Germany	79,200,000	954,210,000
France	77,200,000	507,970,000

	<u>Records</u>	
United States	\$414,700,000	\$1,519,730,000
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Germany	196,080,000	1,024,110,000
France	(not given)	808,400,000

The same paper estimated the number of phonograph sets in the world as 21,627,107: this makes one for every eighty-eight persons. About one-half of the phonographs are in the United States.

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EDUCATIONAL USE OF THE PHONOGRAPH

One of the first of the phonograph industries to interest themselves in the educational side of their instruments was the Victor Talking Machine Company, which formed an Educational Department in 1911, placing Mrs. Frances Clark at its head. While there was a commercial flavor to the first publications, it was at least a pioneer work, and one which rapidly acquired real educational intent.

The first books were obviously on an adult level, but subsequent editions brought forth material that was better adapted to child understanding.

In some twenty years of existence, the department included sixteen representatives who travelled about introducing the various Appreciation courses demonstrating the use of records. It is to be regretted that this department was discontinued in April 1931, although Mrs. Clark has been retained by RCA-Victor to carry on alone.

Columbia followed Victor with an Educational section about five years later, but it never reached the size or the useful purpose of the pioneer in the field. Brunswick never formed such a department.

The extent of these ventures is suggested by Mrs. Clark, who writes:

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"As you may know, our Educational Department is now nearly twenty-one years old. In that period of twenty-

one years, Victrolas of one sort or another have been placed in almost every school in the United States. I should say, roughly speaking, that probably at least eighty to ninety per cent of the schools have some sort of equipment.

"The records used would be wholly problematic. We have no means of knowing, but of course they run into the millions."*

Victor published several books, some of the Appreciation nature, some for indirect educational influence upon the general public. Of the directly educational books we may note, Music Appreciation for Children, Music and Romance, Lecture Laboratory Course in Musical Appreciation, and What We Hear in Music. The latter, from the pen of Anne Shaw Faulkner, has been published in six editions from 1912 to 1929, and has been, perhaps, the most generally used of the Victor Educational Books. Of an indirect educational value (although it has been used with some Appreciation Courses) we should note the Victrola Book of the Opera, which listed the stories of 120 operas, suggesting illustrations numbering almost 1200 from the company's catalog. The 1923 Catalogue of Victor of A Graded List of Victor Records for the Home, Kindergarten and School was an early attempt to grade material for educational use: it listed about 1500 recordings, and gave about 875 descriptions or records.

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Silver, Burdett and Company have printed Music Appreciation for Every Child, and Music Appreciation Manuals for the Elementary and Junior High Schools (with student manuals) by Mabelle Glenn and Margaret Lowry, both of whom are authorities in the work in Public Schools. Each of the manuals lists from eighty to ninety phonograph records to be used as illustrative material.

The Universal Publishing Company has released a popular series of Music Appreciation Readers compiled by Hazel Gertrude Kinscella, illustrated almost wholly, as it happens, by Victor records.

Ginn and Company began in 1923, and completed in 1927 their "Music Education Series" which lists about 300 selections. This company, contrary to the usual procedure, outlined its material first, and then commissioned Henry Hadley together with some members of the New York Philharmonic Orchestra to make such recordings as were deemed necessary to illustrate the text.

The Federation of Music Clubs sponsored a series of books to be used for lectures. These included Gehrken's, The Fundamentals of Music; D.G. Mason's, From Song to Symphony; Dr. Kelley's, Musical Instruments; Hamilton's, Epochs in Musical Progress; and Goetschius', Masters of the Symphony.

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Ginn and Company began in 1923, and completed in 1927 their "Music Education Series" which lists about 300 selections. This company, contrary to the usual procedure, outlined its material first, and then commissioned Henry Hadley together with some members of the New York Philharmonic Orchestra to make such recordings as were deemed necessary to illustrate the text.

The Federation of Music Clubs sponsored a series of books to be used for lectures. These included Gehrken's, The Fundamentals of Music; D.G. Mason's, From Song to Symphony; Dr. Kelley's, Musical Instruments; Hamilton's, Epochs in Musical Progress; and Goetschius', Masters of the Symphony.

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Other publications might be mentioned. Two books which have a wide popular use are Hamilton's Music Appreciation, and Lawrence Erb's Music Appreciation for Students. Henry Bremmer, in Messages of Music, lists about 300 Victor records, and gives descriptive texts to create a mood for the music. Dorothy Moyer's Music Appreciation is another book well illustrated by a list of records. Ruth Durham, Supervisor of Music in Washington, produced a book on Music Appreciation (1921) in which she tried to correlate with music other fields of learning. Her list carries both Victor and Columbia records.

Percy Scholes has been active in this phonograph educational movement. His First, and Second Books of the Gramophone Record have been widely read. In these he has listed compositions that seem to best reproduce the concert hall qualities of actual performance.

In London, the National Phonograph Society issues lists for its members. An interesting pamphlet, offered in 1925, and supplemented in 1926, was a list of records of Chamber Music culled from both foreign and domestic catalogs.

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of this kind is being initiated by the Parlophone records, edited by Dr. Curt Sachs, of Berlin, and called "2000 Years of Music".

Some of the companies issued Educational lists of records. The Victor were especially successful in this work. A hint as to the value of such lists is given us by the Phonograph Monthly Review - ever active in the interests of the phonograph public. We read:

"On going through these records carefully we have become more and more impressed with the possibilities now open to schools and those engaged in educational work. Moreover, altogether apart from the value of these records for educational purposes, many of them will be of interest to the general music lover. A number of the selections are unavailable elsewhere in recorded form, and many more are here available at very reasonable prices."*

Columbia tried to carry her educational work to the pupil in still another way. Records were issued in two forms: one set offered rote songs with accompaniments for models; the other set offered only the accompaniment for the child to sing with. Here was one attempt to give complete musical experience.

An inquiry addressed to the National Bureau for the Advancement of Music brought forth this reply from C.M. Tremaine, the Director:

* Phonograph Monthly Review, May 1927, P 323.

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The Gramophone Company in London has been as active as its sister company - RCA-Victor - in supplying educational lists.

Two articles which lend excellent support to the phonograph and its part in the English Schools have appeared in the Gramophone.

The Reverend J.B. McElligott, Director of Music at Ampleforth College says, in part:

"....The gramophone has important functions to perform in schools.

" First, then, the gramophone is the only means of putting boys in direct contact with many musical works which otherwise they would not hear. The enjoyment of music which leads to a sound understanding of it falls into two parts: there is the music itself, the message, what the composer wishes to say; and there is the presentation of it, the playing or singing. This second part, the presentation, itself divides into two: the style and accuracy of the playing or singing, and the quality of tone. Quality of tone, let us admit, is difficult to judge by gramophone reproduction alone. It is, however, not at all impossible to learn a good deal about tone from the gramophone.....

" But the main function of music, the contact between the mind of the composer, as expressed in musical work,

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But the main function of music, the contact between the mind of the composer, as expressed in musical work,

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and the mind and heart of the listener, is the chief use of the gramophone in school, and in the case of many works the gramophone is the only means of realising this. There are simply no facilities in most schools for boys to hear the larger orchestral works, beyond an occasional local concert."*

The Reverend Robertson Ballard is equally enthusiastic about the phonograph in education. He writes:

"Gramophones are in most homes. Furthermore, they are used and employed in these homes. The coming of wireless has definitely increased the popularity of the gramophone, as is easily proved by the tremendous growth of all the leading gramophone companies in the last few years.

"The power of the gramophone in education is being more widely recognised every month. It is safe to prophesy that it must play an even more prominent part in all progressive schemes of educational advancement. For some considerable time many schools have been utilizing the gramophone to supplement the efforts of their musical staff, with excellent results. The teacher can never hope to play the piano or violin as any of the great virtuosi; nor can any school orchestra ever hope to render a symphony as do the famous orchestras of the world. Now thanks to the gramophone, it is possible for every pupil to hear the great masters and orchestras playing the masterpieces. Such records must prove of inestimable value to both teacher and scholar."**

*Anderson, W.R: "The Gramophone in School", Gramophone, June 1927, Pp28-30.

**Ballard, Robertson: "The Church and the Gramophone", Gramophone, May 1930, P 560.

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Ballard, Robertson: "The Church and the Gramophone", Gramophone, May 1930, p. 260.

CONCLUSION

While gramophone progress had been somewhat slow in the mechanical recording stage, phenomenal progress has been made since the advent of electrical recording. Technically and musically, new fields have been opened and invaded. That educational pursuits were only a part of its public contact, we may understand. But the steady release of more and more of the better grade of music records is an indication, in this country at least, that there was a demand sufficient to warrant the venture.

People were sensitized to good music, to fine orchestras, chamber music, solo voices - all through their own choice.

While the radio was, and still is, a potential rival, the two industries have been united through electrical recording. That the radio is taking advantage of this device is evident in the constantly growing tendency to use electrical transcriptions.

Certainly the radio, at its inception, was the heir to a great musical public. People were already prepared for the invisible performer.

The phonograph had been almost exclusively devoted to music. But in radio broadcasting, music shared with the spoken word.

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GENERAL HISTORY

As early as 1888, experiments in wireless communication were conducted in England. Not until 1897, however, did the discovery of Hertzian waves (electric waves sent through space with the speed of light) reveal a promising field of research. From 1898-1900, there were various technical developments.

RADIO

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General History

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Africa

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From 1902 various nations enacted laws

International Aspects

which required all ships to be equipped

Summary of World Radio

with wireless apparatus and a trained operator.

About 1902 Lee de Forest and Reginald Fessenden, both scientists, contributed technical improvements which were to make the introduction of radio to a world public. In 1906, as a test for distance and carrying power, Fessenden actually transmitted a musical program of records.

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From 1902 - 1912, various nations enacted laws which required all sea-going vessels to be equipped with wireless apparatus and a competent operator.

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* Schubert, Paul: The Electric Word, Page 21.

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* Schumbert, Paul: The Electric Word, Page 21.

In 1908 the Marconi Trans-Atlantic Radio Stations were opened to the public for radiograms between Great Britain and Canada. In America the research laboratories of the General Electric Company were bringing radio communications to a height. By 1915 the American Telephone and Telegraph Company had talked to Paris and to Hawaii from Washington, D.C.

From 1914 - 1918 the War interrupted random experimentation; but serious research was continued by all nations as a protective measure, in full knowledge of its potent usefulness for communication. By 1918, the Atlantic had been definitely conquered by radio.

At the close of the War, in 1919, practically all of the high-powered stations were under foreign control. In this year the Radio Corporation of America took over the Marconi Wireless Telegraph Company of America and the radio interests of the General Electric Company.

Radio history now dissolved into national movements. In a later section - International Aspects of Radio - we shall resume this general movement.

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THE UNITED STATES

Development

In this country radio broadcasting has gone through three stages of development: first, dependence upon phonograph records; second, the use of local artists; third, national net-work programs and the use of nationally known people.

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NORTH AMERICA

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One of the first clear voices to come over the air -

UNITED STATES

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Development

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Network Programs

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Types of Programs

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Schools of the Air

On the Networks

Net Programs

Music

Schedules

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MEXICO

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CUBA

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1920 was a year of enthusiastic amateur radio.

Harold Robinson, a fifteen year old school boy of Keyport,

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telephone transmitter, for he was heard in Scotland by

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One of the first clear voices to come over the air - in 1920 - was that of Frank Conrad, an employee of the Western Electric and Manufacturing Company of East Pittsburgh, Pennsylvania. In 1915 he had erected a set to hear navy signals. Two years later he had received a government license to operate. In 1917, although a government war measure had automatically suspended all amateur licenses, Conrad was allowed to retain his that he might carry on experimental work for his country. After the war, 1919, amateur entertainment was resumed.

1920 was a year of enthusiastic amateur radio. Harold Robinson, a fifteen year old school boy of Kew-Forest, New Jersey, held a long-distance record with his radio telephone transmitter, for he was heard in Scotland by another zealous experimenter.

Conrad, for his first programs over the air, borrowed records from a Brunswick Phonograph Shop through the courtesy of the manager's son who was invited to announce the program. In 1920 Pittsburgh Department Stores began to sell sets, advertising that the Conrad broadcasts could be heard. Messages began to reach him for request programs. News items of this procedure came to the attention of Harry P. Davis, Vice President of the Westinghouse Electric, who conceived the idea of using Conrad's apparatus for giving returns on the Harding-Cox national election. The success of this 'stunt' led to the establishment of a permanent station - KDKA - in 1920.

Ten months later, when patent troubles had been cleared, other stations began to operate. By December, 1921, there were five in action, and there were, by estimate, about 6,000 receiving sets in use. By 1922 there were 500 stations operating: even the Navy Department was broadcasting as this first fever swept over the nation.

Between 1923-25, the number of stations continued to increase. Competitive selling and cut prices placed many radio sets within reach of the pocket-books of the masses.

By 1924 the excessive competition with radio in the entertainment sphere forced the phonograph to seek new markets: patents proved a momentary barrier to the invasion of the radio field, but the gradual merging of

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radio and phonograph interests offered a solution beneficial to both industries.*

In this same year there was an estimate of 2,000,000 to 3,500,000 sets in use, about 16,000 amateur transmitters, and over 550 stations. A poll of the fifty-four major stations' programs indicated that for the average day, popular music was broadcasted 37% of the time, good music for 17%, and the remainder was taken up by lectures, news, weather, and time.**

From 1922-1924, amateur talent was not only accepted but solicited for broadcasting purposes.

Net-work Programs

"Broadcasting in the United States began, and has largely remained in the almost unchecked control of the owners of radio patents and the manufacturers of radio receiving sets."***

About 1924, the American Telephone and Telegraph Company experimented with interconnecting wires - the hook-ups that were to lead to chain broadcasting. A year later, the first radio net-program was given, John McCormack and Lucrezia Bori being the featured artists. Big business seemed to be launching radio programs to a new and higher standard.

* For a complete list of mergers, see Appendix A, Pl23.

** Bliven, Bruce: "How Radio is Remaking Our World", Century, June 1924, Pp 147 - 154.

*** Orton, William: "The Level of the Thirteen Year Olds", Atlantic Monthly, January 1931, P 1.

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In November 1926, the RCA incorporated station WEAJ of New York under the name of the National Broadcasting Corporation, a business enterprise that pooled the patents of General Electric, Westinghouse, American Tel. and Tel., making NBC a dominant power in the radio world. The inaugural program for NBC on November 15, 1926, represented the first big step in chain broadcasting. On January 1, 1927, NBC began to operate on a national scale. In the same year its genetic purpose was realized when the International Advertisers Association recognized Radio as a legitimate advertising medium.*

There was no government control of radio in its youth in the United States. The Radio Act of 1912 merely provided regulations concerning licenses and general goodwill in coöperating with others on the air: but it gave the Department of Commerce no real authority. Control was impossible. And in 1926, with over 700 stations on the air, some of them having jumped on the wave-lengths allotted to Canada, there was urgent need of legislation.

The Radio Act of 1927 did create a Federal Radio Commission whose duty it was to regulate the number of stations in accordance with the eighty-nine frequencies available for use in North America. Of these, Canada was to receive six clear channels and to share eleven others with our stations. The United States used the rest.

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Thus the Government exercises a remote control over radio, but is not concerned with the direct project. Under the Federal Radio Commission a license for a station is renewed every ninety days to allow a check-up on obedience to regulations and public usefulness. Amateurs were steadily pushed off their original wave bands to provide a maximum of outlets for public broadcasting.

On September 18, 1927, the Columbia Phonograph Company established the Columbia Broadcasting System with the key station at WABC, New York.

In spite of the fact that advertisers were reputed to have spent, in 1928, about \$12,000,000 on programs over the net works, not until 1929 was a profit shown in this newest system - CBS. In 1928 there was an estimate of 9,500,000 receiving sets and an audience of about 40,000,000. In 1929 over 200 advertisers used the facilities of NBC at a cost of about \$13,000,000. Over the two networks \$19,000,000 were spent for commercial programs.*

In this same year Victor Talking Machine Company was merged with RCA.**

1930 marked the tenth anniversary of radio in the United States. Five years were devoted to practical development: five were spent in perfecting the various types of programs.

* Arnold, Frank A: Planning a Campaign of Broadcast Advertising, NBC, 1930, new series #C.

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* Arnold, Frank A: Planning a Campaign of Broadcast Advertising, WBC, 1930, new series 50.

** For a complete list of mergers, see Appendix A, P133.

In 1930 there were about 600 stations in all: of these, CBS had seventy-two in control; NBC had seventy-five in its system. The National Advertisers paid an estimated total of \$28,000,000 into the industry. The United States Census of 1930 gave the total number of sets as 12,078,345, and estimated the number of listeners as 50,000,000.*

In June 1931 there were 609 licensed stations, about one-fourth being associated with the two great chains for program material. NBC controls through its red and blue networks eighty-five stations; ninety stations are associated with the CBS Yankee and National networks. NBC offered 33,000 broadcasts for the year. Both chains have a potential audience of 40.3 per cent of the total population of the country.*

Types of Programs

There are two types of programs in the United States.

Sponsored Programs are the so-called commercial broadcasts financed by an advertiser who pays not only for the facilities of the station, but also for the talent for his program. Under this same heading we may

* For complete figures upon the distribution of radio sets in the United States, Census 1930, see Page 126, Appendix B.

In 1950 there were about 600 stations in all: of these, CBS had seventy-two in control; NBC had seventy-five in its system. The National Advertisers paid an estimated total of \$28,000,000 into the industry. The United States Census of 1950 gave the total number of sets as 12,078,345, and estimated the number of listeners as 50,000,000.*

In June 1951 there were 609 licensed stations, about one-fourth being associated with the two great chains for program material. NBC controls through its red and blue networks eighty-five stations; ninety stations are associated with the CBS Yankee and National networks. NBC offered 35,000 broadcasts for the year. Both chains have a potential audience of 40.5 per cent of the total population of the country.*

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* For complete figures upon the distribution of radio sets in the United States, Census 1950, see Page 120, Appendix B.

include "Spot Broadcasting", a use of electrical transcription, which may be utilized by a national advertiser who wishes to reach selected local areas inadequately covered by a network.*

The Sustaining Program is the second type. It is often prepared and popularized by a station, and later sold to an advertiser desirous of becoming a client. If such a program is presented by a key station, it is offered for an hourly charge to associated stations. About two-thirds of the chain broadcasts are made up of this kind of program. Of course, local stations may present their own sustaining features.

In addition to the financial support by these commercial programs, revenue comes to the networks through their merger-associations and through their artist bureaus. Radio is now a money-making business. The advertisers pay the initial cost to introduce products to the public, but the people pay indirectly for their entertainment in proportion to their response to salesmanship.

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EDUCATION

As early as 1921 the State Universities of Iowa, Nebraska, and Wisconsin were operating broadcasting stations. In the following year sixty educational institutions, forty-seven of which were colleges or universities, were on the air. By 1926 there were 105 educational stations: in 1927, 104 remained.

In 1927 the Federal Radio Commission whittled down the number of commercial and educational stations; still others were unable to finance their programs and were forced out of the radio field. In 1931 only fifty-one educational institutions remained on the air. However, there were about as many more schools using the facilities of local commercial stations.

There are two lines of supplementary work possible through the medium of the radio: definite instruction in a tool subject, or appreciation programs. Neither is of any use unless there is stimulation to action. It must be noted that radio is seriously handicapped by a lack of direct teacher-pupil instruction.

However, educators have their eyes particularly upon the 12,000,000 students in the rural districts of the United States. In their belief, not only has progress in educational broadcasting been slow, but the appeal has been of a low level. Some of the educational leaders are particularly bitter about the situation.

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Joy Elmer Morgan, Chairman of the National Advisory Council on Radio in Education,* accuses the commercial interests of gobbling up the best wave lengths, and chides the Federal Government for depriving the states of their own rights by the creation of the Federal Radio Commission who "reduced their educational stations assignments to less than seven per cent of our broadcasting facilities...."***

Morgan reflects the opinion of the educators by continuing:

"So far, our American radio interests have thrown their major influence on the side of greed. In striking contrast to other leading countries, they have preferred a hasty mushroom development to a slower and sounder development."***

He continues:

"There are those who profess to fear the censorship of radio stations operated by local, state, and national governments. Do they fail to realize that we already have censorship - a censorship applied not by government which is elected and maintained by the people and responsible to their control, but a censorship maintained by powerful private interests who are responsible to no one but to their own selfish ambitions?...."

*Organized to inaugurate a five-year plan for education and pledged to seek a reservation of fifteen per cent of the total time on the air for educational radio broadcasts.

**Radio and Education (Proceedings of the First Assembly of the National Advisory Council on Radio in Education, 1931). P 125.

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**Radio and Education (Proceedings of the First Assembly of the National Advisory Council on Radio in Education, 1931), p. 125.

**Ibid., p. 121.

During the past few years under our present system of management, radio programs have fallen to the lowest point in the entire development of broadcasting. In spite of brilliant programs here and there, the general level of radio offerings is utterly unworthy of the tastes and the aspirations of the American people.*.....

"The commercial stations seek to reach the great numbers of people. They measure the worth of their programs by the size of the audiences. In order to get large audiences, they cultivate the lower appeals. The educational stations realize that the finer things of life have always appealed to the few. Education seeks to maintain standards and to pull up."**

Program control is under fire when considered in terms of educational usage. One educator says: "Education cannot compete for 'room on the air' with national advertisers. There are even people who hold it ought not to be compelled to."***

There is evidence that the Federal Radio Commission is making an investigation of the whole situation. Some of its findings support the educational viewpoint, some challenge it. Harold Lafount, a member of the FRC in a recent address said that forty-nine stations (educational) had been assigned 3,669.2 hours per week to broadcast; statistics showed that approximately one-third of the allotted time on the air was actually used. Educa-

*Ibid., P 128.

**Ibid., P 130.

*** Orton, William: "Unscrambling the Ether", Atlantic Monthly, April 1931, P 436.

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tional stations have been given one-tenth of the total available time in the United States. Since they do not use all of this, he can see no reason for agitation for fifteen per cent.*

True, the educational stations are given the poorer wave lengths and lower power. About two-thirds of the cleared channels^{**} - forty in number - belong to either one or the other of the two chains.

The congestion on the air was made evident by a report of the Committee on Engineering Developments of the Council itself:

"The conclusion drawn by your committee is that, available facilities being strictly limited and in intensive use, the needs of the educational broadcasts can most simply be met from the engineering viewpoint by the utilization of all or a part of the available time of existing station assignments rather than by the creation of additional stations or by any other measure which involves increasing radio congestion and interference."***

The same report gives a neat answer to the educators' request for state control:

*Rorty, James: "Impending Radio War", Harper's, November 1931. Pp 714-26.

**Cleared channels are those frequency bands which are used exclusively by a single station. All other frequencies are shared by two or more stations which broadcast at different times of the day.

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"Radio transmission in its nature extends across State boundaries, and is subject primarily to Federal regulation as interstate commerce. There is no available method whereby signals can be stopped, absorbed, or blocked at a State boundary so that the listeners within the State may be protected against such signals.....

" The Committee draws the conclusion that the transmission of programs for educational purposes will demand close co-ordination between the various educational agencies involved, inasmuch as the transmission of appropriate material to selected audiences at given times is a matter which cannot be accomplished by radio without such co-ordination and co-operation."*

There have been definite attempts to turn radio towards education. One of the first was a course in Music Appreciation which was designed to supplement the school work.

William Bagley (Professor of Education, Teachers College, Columbia University, and Dean of the Advisory Faculty of the American School of the Air) says in relation to school programs, ".....credit should first be given to the pioneer and highly successful work of Mr. Damrosch and the National Broadcasting Company in the field of Music. It is impossible to estimate the influence that these programs have beyond doubt exerted in advancing the standards of musical appreciation in the coming generation.**

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It was David Saroff, Vice President and Manager of RCA, who approached Walter Damrosch with the idea of a series of symphonic musical appreciation hours. In the spring of 1927, NBC experimented with a broadcast of three children's concerts to all available stations east of the Rockies. There was an eager response especially from the rural districts. In the first three weeks, there were 25,000 letters of congratulation. For the 1927-28 school year a definite series of concerts was planned and executed for twenty-seven of the associated stations. In 1931 the NBC sent the Damrosch hour over seventy-one stations, on its combined networks: his broadcasts are included in the curriculum of 150,000 schools. NBC claims an audience of from 3,000,000 to 5,000,000 children in the schools, as well as many adults in the home. Damrosch says: "I can already see that this spread of good music among children, at an age when they are most susceptible, and this effort on our part to make them realize that music is a language of the emotions is having its effect...."* There is a record of at least thirty orchestras as early as 1929 organized as a direct result of this NBC feature.**

*Damrosch, Walter: "Broadcasting Music with the American Nation as an Audience", Radio and Education, Proceedings of the Nat. Adv. Council of Radio in Educ. P 172.

**Kempf, Paul: "What Radio is doing to our Music", Musician, June, 1929. Pp 17-18.

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While the appreciation field is more fertile, there have been scattered instances of direct musical instrument instruction. The University of Michigan, assisted by the State Department of Public Instruction, designed for the rural districts a band instruction course which reached about 3,000 children. The venture consisted of five half-hour periods of instruction. All instruments were taught at once and the music consisted of well-known songs, issued in booklet form, free upon request. It was seen that the course would have been more valuable if there had been a series of from ten to fifteen lessons.

NBC has also ventured into the field for direct music instruction. One series was under the direction of Osborne McConathy, prominent in Public School Music work. To this series of Tuesday afternoon lessons there were requests for 75,000 charts of material. A high adult response was reported.

Sigmund Spaeth directed the other NBC feature, illustrating his lectures freely with artists.

Schools of the Air

The best example of intensive educational radio in the United States is the Ohio School of the Air, organized by the Ohio State Department of Education in late 1928.

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WLW, Station WEAO (Ohio State University) and many public spirited citizens who gave their time and talent before the microphone."*

The Ohio School of the Air regularly broadcasts through the school year fifteen regular features. It has been reported as heard in twenty-seven states, and reaches about 500,000 people. The Ohio State Legislature appropriates about \$140,000 each year. The program is given every school-day afternoon from 2.00 to 3.00 p.m. It has no appreciation hour of its own, but utilizes the Damrosch hour.

The American School of the Air, in its initial appearance, was sponsored by Grigsby-Grunow and CBS, later by CBS alone. It has been organized by an imposing list of educators in all fields of learning. This series is received in about 20,000 schools, its programs consisting of various series of fifteen half-hour periods, each series being given to a definite field of education.

Both of these well defined schools were preceded by various experiments. However, since these pioneer attempts to use Radio in Education, the movement has grown and has developed in an organized manner. Some of the Colleges and Public Schools offer only entertainment through their broadcasts; others offer strictly educational courses.

*Perry, Armstrong: Radio in Education, (The Payne Fund), second edition, P 7.

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 Perry, Education in Education, (The Johns Hopkins
 second edition, N. Y.

Many Civic Clubs and groups have contributed to the general educational development of radio. For a detailed view of this movement the reader is referred to a publication by Armstrong Perry, Radio in Education, second edition, published by the Payne Fund, One Madison Avenue, New York City, issued gratis to educators.

Education on the Networks

Certain educational features are offered free. We have already mentioned the Damrosch hour supported by NBC. This chain also sends out a program each Saturday afternoon from the Metropolitan Opera House. Other educational features - non-musical - are given.

According to Bagley, Columbia Broadcasting System "is now providing educational broadcasting at an expense far in excess of a half-million dollars annually, the program of the American School of the Air alone accounting for approximately this sum".*

That these chains have time available for education is evident. Henry Adams Bellets (Vice President, Columbia Broadcasting System, and former member of the Federal Radio Commission) said in a recent paper:

"I have no hesitation in saying that the state universities could have without cost to them, five times as many hours on commercial broadcasting stations as they are now using, and win the undying gratitude of the broadcasters to boot, if only they were equipped

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to put on reasonably interesting programs."..... "Segregate the teachers in a limbo of special wave-lengths, and we condemn them to remain unheard and disregarded."*

The NBC has followed the ensuing policy:

"In all of these programs, drama, news, entertainment and information are elements as well as education. Personality is found to be of first importance in radio programs, educational or otherwise. A personage known to the public mind by position or attainment, is assured of an audience at the outset; the program must hold it."**

There are at present two investigations of the educational question.

A bill has been presented to the Senate by Senator Cousens of Michigan calling for an investigation of the network commercial advertising media. Specific resolutions are given as to the use and adherence to public interest. In regard to these resolutions the National Advisory Council states: "In the face of these specific questions it will be rather difficult for the Federal Radio Commission to whitewash itself of the favouritism it has shown commercial radio interests and the radio trust."***

The Federal Radio Commission itself is conducting an investigation of the educational facilities of the networks.

*Bellews, Henry Adams: "Commercial Broadcasting and Education", Radio and Education, (Proceedings, Nat. Adv. Council, 1931, P 55).

**Perry, Armstrong: Radio in Education, Payne Fund, P 96.

***"Commercialized Radio to be Investigated", Education by Radio, Bulletin Vol 2, #3, January 21, 1932, Nat. Council.

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**Perry, Armstrong: Radio in Education, Payne Fund, 1936.

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Radio, Bulletin Vol 5, No. 45, January 21, 1932, Nat. Council.

A questionnaire which has been sent to all stations has for its most important questions:

"Have you offered your facilities to local schools, colleges, and universities? If so, what were the terms and conditions?"

Has the use of your facilities been requested by local schools, colleges and universities? If so, under what conditions and terms?

To what extent have your local schools, colleges and universities used your station? Give number of hours per week.

Are you now broadcasting for any of them? If so, during how many hours per week and under what conditions?

Do local educational institutions use all the time you are willing to provide?

How many hours were devoted during the week of November 8 to 14 inclusive, to sales talks, or a description of the commodity advertised, the terms of contests, etc."*

In order that an unbiased survey of the educational stations could be included in this paper, the writer sought information from them through a questionnaire.

The number of Educational Stations approached was fifty-one: of these, thirty-three replied. However, four gave no educational information, but two gave partial information which could be included in the results.

The totals are therefore gained from twenty-nine replies.

*New York Times, Sunday, January 24, 1932, Listening In, P 14-X.

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TOTAL NUMBER OF HOURS ON THE AIR962 hrs. 45 m.

Total Hours given to Education 717 hrs.
Total Hours to entertainment 245 hrs. 45 m.

Percentage of Talking 52%
Percentage of Popular Music 20%
Percentage of Classical Music 28%

Hours of Classical Music 255 hrs. 45 m.
Direct Broadcast of Classical
 Music to Schools 30 hrs. 15 m.
Indirect Educational Broadcast
 (Classical Music) 139 hrs.
Hours for Music Appreciation 38 hrs. 45 m.
Direct Music Instruction 4 hrs. 30 m.

Thirteen devoted all their time on the air to educational features. Sixteen did not. In all, about one-quarter of the time on the air was devoted to entertainment. Response to their broadcasts was moderate.

It is evident that as yet the best educational music programs are supported either commercially or through the generosity of the network stations. In spite of the universal quality of music, educational institutions have not availed themselves of its appeal, since three-fourths of all the music offered was presented as pure entertainment rather than as a deliberate educational feature.

Particulars pay most highly to reach a large group of people. Estimates made for the National Broadcasting Company showed that approximately forty per cent of the listeners tuned in from seven to eight o'clock; ninety per cent from eight to nine; ninety-five per cent from nine until ten and under ten per cent after ten. "Survey of the Thirteenth Year 1934", Atlantic Monthly, January 1935, p. 3.

**Radio Act of 1934, Section 19.

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NETWORK PROGRAMS

There are three types of broadcasting stations: those owned by the radio business; the ones controlled by newspapers, stores, etc.; and stations under an educational or religious institution.

All of these must be financed. In the United States there is no direct way of taxing the listeners for program material. The Federal Radio Commission has said, "Advertising must be accepted for the present as the sole means of support for broadcasting".* And Congress in its Radio Act of 1927 provided that sponsors should be publicly announced.**

Eleven years ago there were no commercial programs. But today, radio is considered one of the greatest means of reaching the people through advertising. Radio can control the public mind, and big business knows it.

Since radio stations have discovered that the hours from seven until eleven in the evening are the most popular for listeners, these are the hours for which the advertisers pay most highly to reach a large group of people. Estimates made for the National Broadcasting Company showed that approximately forty per cent of the listeners tuned in from seven to eight o'clock; ninety per cent from eight to nine; ninety-five per cent from nine until ten; and under

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Eleven years ago there were no commercial programs. But today, radio is considered one of the greatest means of reaching the people through advertising. Radio can control the public mind, and big business knows it. Since radio stations have discovered that the hours from seven until eleven in the evening are the most popular for listeners, these are the hours for which the advertisers pay most highly to reach a large group of people. Estimates made for the National Broadcasting Company showed that approximately forty per cent of the listeners tuned in from seven to eight o'clock; ninety per cent from eight to nine; ninety-five per cent from nine until ten; and under

*Orton, William: "Level of the Thirteen Year Old", Atlantic Monthly, January 1931, p. 5.

**Radio Act of 1927, Section 19.

eighty per cent between ten and eleven o'clock. In any one evening, about forty per cent of the nation's radio receiving sets are silent: about twenty per cent of the listeners hear any one program. Competition for listeners is keen.

Thus, educators find it is not only well-nigh impossible to engage evening time on commercial stations since the networks can and must command high prices for these desirable hours, but they find it difficult to obtain permission to operate their own stations during these hours since the problem of interference is always present. Whatever educational talks do find their way on the evening's program rarely exceed ten minutes.

Most of the evening hours are frankly entertainment and not of too high a type in many cases. This is evidently the fault of the advertisers who are striving "to please"; it is the cause of the chagrin of the educators, and of much of the criticism by the general public against the period of salesmanship which inevitably accompanies each program.

The national networks claim that they rarely sell more than thirty per cent of their time on the air. Frank Arnold (Director of Development of NBC) estimated that \$20,000,000 was spent for commercial programs in 1931.

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of its frankness was necessarily written anonymously. We read in part:

"....I am sickened when I am obliged to ballyhoo Schubert and cheer him on as if he were a famous quarter-back doing a broken-field run. I should rather like to hear honest music honestly presented, listen to the play of honest minds, away from this sticky, hypocritical fog of emotions, fellow-ship, and uplift, barren intellects and conceited ignorance.".....

"Conscious that isolated periods of decency do not make amends for insufferably long stretches of maldroit advertising and pseudo-entertainment, the two national chains have during the last six months made strenuous efforts, in the news columns, to improve conditions. Famous concert names and bureaus have been merged with them, and the air was full of promise. But, the results have been negligible so far. Perhaps something will arise later from this official union of talent with commerce. Meanwhile, in our great depression, the many questionable hours return handsome profits to the station."*

Henry Adams Bellews says:

"No one would deny that there is a good deal of offensive advertising in connection with radio. It is, however, preposterous to put the blame for this on the broadcasters, whose dream of Paradise is a world in which advertisers are content with mere credit announcements at the beginning and end of each program."**

*"I'm Signing Off" (Anonymous), Forum, February 1932, Pp.108-114.

**Commercial Broadcasting and Education", Radio and Education. P 48.

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*"I'm Glimming Off" (Anonymous), Forum, February 1932.
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Major General Saltzman (Chairman of the Federal Radio Commission) has stated that he believes the responsibility for inaugurating better programs lies with the listeners. Their good will is necessary. Both station and commercial broadcaster are dependent upon it.

Music

"In the early days of national broadcasting the thing which probably saved the day was the discovery that 'the great common denominator of broadcasting' was music."*

It is estimated that in the city there are twenty radio concerts to one real one: and in the country, there are two hundred radio concerts to a single real one. Certainly in the field of popular music, radio is the greatest single consumer.**

In 1926 it was estimated that nine-tenths of all radio programs were of music. Good music was dropped in to the programs incidentally, thus reaching many who were not prepared to tune in deliberately for it. "The unseen audience is being educated, without its knowledge, into a liking for better things, until we have already reached a point where programs that were acceptable two or three years ago would not be tolerated today".***

*Arnold, Frank: Broadcast Advertising, P 29, series of

**"Music-Radio Department," The Billboard, January 9, 1932, P 22-23,

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In 1927 when the national hook-ups led broadcasting into regular concert halls, radio entertainment enjoyed as enormous growth. Music again was the most popular feature, since it was found that the speaking voice was monotonous in the absence of the human personality itself.

In 1929 the programs were given over to various types of music as follows:

Classical Music	28%
Jazz	14%
Spirituals, folk songs, and favourites	10%
General conversation	48%

In these later years, NBC claims that about three-fourths of its programs have been given over to music. More and more, program builders are daring to insert the better types of music. Thus people are learning to become familiar with various types of music, and the new experience is a source of enjoyment.

The gradual perfection of the reception of musical tones has had much to do with the presentation of the better concerts. Previously, the music of Wagner or of Debussy was an unfortunate choice for radio concerts, but of late there have been entire programs of Wagner's music with an enthusiastic response from the audience.

This year (1932) for the first time, a series of Chamber Concerts is being sent out from the New Library of Congress, Washington, D.C.

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To gain a clearer idea of the proportion of a week's programs given to various items, from the hours seven to eleven o'clock, a personal time-study was made by the writer of one Boston station associated with each national network: i.e., WNAC associated with the CBS network, and WEEI associated with NBC were timed.

The results are given in the following tables.

	Time in hours	Percentage of time
All sponsored	10.000	17%
All sustaining	2.400	4%
Local sponsored	15.000	16%
Local sustaining	2.200	3%
Spot broadcasting	1.600	3%
<hr/>		
All sponsored programs	15.000	23%
All sustaining programs	10.000	10%
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Total time for the week's programs	100.000	100%

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The results are given in the following tables.

TIME SCHEDULE

Station WNAC at Boston
 Columbia Broadcasting System
 Sunday, November 29, 1931, to Saturday, December 5, inclusive.

Types of Programs		
Program	Time in Seconds	Percentage of Time
Net (sponsored)	67,039	67%
Net (sustaining)	6,464	6%
Local (sponsored)	15,389	16%
Local (sustaining)	9,253	9%
Spot Broadcasting	2,655	2%
All Sponsored Programs	85,083	85%
All Sustaining Programs	15,717	15%
Total Time for the Week's Programs	100,800	100%

TIME SCHEDULE

Station WABC at New York
 Columbia Broadcasting System
 Monday, November 10, 1931, to Saturday, November 13, 1931.

Types of Programs

Program	Time in seconds	Percentage of time
Net (sponsored)	27,000	27%
Net (sustaining)	5,000	5%
Local (sponsored)	10,000	10%
Local (sustaining)	2,000	2%
Spot Broadcasting	5,000	5%
All sponsored programs	42,000	42%
All sustaining programs 15,000		15%
Total time for the week's programs	100,000	100%

WNAC, continued

Music on Programs

Types of Music	Time in Seconds	Percentage of Time
Classical	10,160	10%
Semi-classical	3,015	3%
Popular	41,485	41%
Theme Music	2,940	3%
	57,600	57%
Non-music Material		
Educational Features	8,440	8%
General Conversation	14,295	14%
Advertising	10,655	11%
Program Announcements	5,075	5%
Station Announcements	4,835	5%
	43,200	43%

The schedule reveals some interesting facts: over half of the time on the air is given to Music: almost one-half of the total time was popular music.

WMAZ, Springfield

Radio on Program

Types of Radio	Time in hours	Percentage of Time
Classical	10,150	10%
Semi-classical	1,015	1%
Popular	11,165	11%
Theme music	1,165	1%
	23,490	

Non-radio material

Radio material	10,150	10%
General conversation	11,165	11%
Advertising	1,015	1%
Program announcements	1,165	1%
Station announcements	1,165	1%
	23,490	

The program consists of some interesting facts; over half of the time the air is given to music; almost one-half of the total time was popular music.

WEEI at Boston
 National Broadcasting Company
 Wednesday January 20, 1932 to Tuesday January 26, inclusive

Types of Programs

Program	Time in Seconds	Percentage of Time
Net (sponsored)	68,315	67 1/2%
Net (sustaining)	8,990	8 1/2%
Local(sponsored)	14,505	14 1/2%
Local (sustaining)	7,190	7 1/2%
Sport Broadcasting	1,800	2%
<hr/>		
All Sponsored Programs	84,620	84%
All Sustaining Programs	16,180	16%
<hr/>		
Total Time for the Week's Programs	100,800	100%

Winnipeg, January 30, 1933 to Tuesday, January 31, 1933, inclusive.
National Broadcasting Company
2221 St. James

Types of Programs

Program	Time in Seconds	Percentage of Time
Sports Broadcasting	1,800	2.2
News (Continuing)	7,700	9.4
Drama/Sponsored	14,000	17.1
News (Continuing)	8,000	9.7
Not Sponsored	22,000	27.0
<hr/>		
All Sponsored Programs	24,000	29.4
All Continuing Programs	15,700	19.2
<hr/>		
Total time for the Week's Programs	400,000	100%

WEEI, continued

Classical Music: all instrumental or vocal music of substance, written by recognized composers.

Music on Programs

Popular Music: all instrumental or vocal music of the

Types of Music	Time in Seconds	Percentage of Time
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Classical	6,875	7 1/2%
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Semi-classical	11,460	11%
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Popular	47,075	47%
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Theme Music	2,915	2 1/2%
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General Conversation	68,325	68%
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General Conversation: any conversation engaged in by the performers, and all transitional spoken words connecting musical numbers.

Non-music Material

Advertising: any indication of sales talks by announcers in the program proper, especially in the commercial program.

Educational Features	5,520	5 1/2%
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General Conversation	12,135	12%
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Advertising	7,590	7 1/2%
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Program Announcements	5,500	5 1/2%
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Station Announcements	1,730	1 1/2%
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Station Announcements	32,475	32%
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Over two-thirds of the time on the air is given to music. Again, popular music represents almost one-half of the total time on the air.

Walt, continued
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 Radio as programs

Types of Radio	Time in seconds	Percentage of time
Classical	6,875	11.4%
Easy-listening	11,400	18.7%
Popular	47,075	75.9%
News	2,900	4.7%
Total		100.0%
Non-radio material		
Instructional	5,400	8.8%
General Interest	22,125	35.7%
Advertising	7,000	11.2%
Program Management	2,000	3.2%
Station Management	1,750	2.8%
Total		38.5%

Over two-thirds of the time on the air is given to music. Again, popular music represents almost one-half of the total time on the air.

The terms of the schedules were used as follows:

Classical Music: all instrumental or vocal music of substance, written by reputable composers.

Popular Music: all instrumental or vocal music of the type of Jazz, and Musical Comedy selections.

Semi-classical: all instrumental or vocal music which falls between the two classes noted above. Folk songs are an estimable example.

Theme music: all music which serves to identify a program.

Educational Features: all lectures of educational merit, the President's messages, International News Talks.

General Conversation: any conversation engaged in by the performers, and all transitional spoken words connecting musical numbers.

Advertising: any indication of sales talks by announcer or in the program proper, especially in the commercial programs.

Program Announcements: the announcer's introduction of Music, Drama, etc.

Station Announcements: identity of the station or broadcasting system, incidental news by the station, time, etc.

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The schedule proves that both systems of national broadcasting utilize Music for the major portions of the programs, but the educational value in the excessive use of popular music is slight.

Information concerning all foreign broadcasting situations is gathered from the BBC Year Books of 1928, and 1932; and from Radio Markets of the World, 1930, Government Printing Office, Washington, D.C.

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OTHER NORTH AMERICAN COUNTRIES

Foreword

The United States is almost the only nation that does not have a receiving license fee. Other nations do; it is collected by various government offices according to regulations for the control of communications. It must be concluded that facilities for obtaining payment of fees are inadequate, for non-licensed sets are estimated in some countries as high as forty per cent of the total number.*

MEXICO

Mexico has about forty stations, eighteen of which are in Mexico City. The number of sets is estimated at 100,000.

The Government reserves the right of censorship, and all broadcasting is administered through the Department of Communications and Public Works.

One of the most important of the Mexico City stations is operated by the Department of Education, indicating that the government is actively interested in the educational advantages of radio.

CUBA

Cuba has sixty-six stations; about half are at Habana. There is an estimate of 28,875 sets serving a population of about 3,418,033. There is no license fee, but permits must be obtained by all listeners.

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CANADA

Canada has a well developed radio system. She has only six cleared channels; thirteen others are shared with the United States. The Canadian Pacific Railroad has been instrumental in giving national programs to Canada.

The fee for receiving programs in Canada is \$2.00. In all there are approximately sixty-four stations, and 296,926 recorded licenses.

In its early history Canada had advertising on its schedule, but the Government on February 15, 1930 entered an agreement which allows, at present, only restricted advertising. The grade of program is similar to that found in the United States.

Canada says: *General History*

"We have no black-face comedians, no crooning tenors, no whispering baritones, and we have no toothpaste to advertise, nothing that is kind to the throat. One realizes, of course, that the world must be amused, but we have found that there is also a general hunger of the mind among our people for good entertainment, and that along with their amusement they are eager to hear scholars, teachers, and men of distinction in various fields of scientific research."*

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Introduction

In Europe, the radio boom came one year later than in the United States. The predominant feature of radio in Europe is its relation to government - either by monopoly or by control.

RADIO

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EUROPE

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General History
Education
Music

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in

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In June 1929 the countries organized the "Prague Plan" to allot wave-lengths for the continent. In that year, twenty-three nations were broadcasting.

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GREAT BRITAIN

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Previous to 1922, "broadcasting was carried out from independent stations in an experimental way at the expense of the individual manufacturers of apparatus"*. But in 1922, the British Broadcasting Company came into being as a limited company, the members still being manufacturers of radio sets and accessories, the capital being a pool of their resources. They took over all existing stations and agreed to operate for a non-profit. A tax of ten shillings was imposed by the Post Office which "alone is empowered to transmit intelligence from one point to another by any form of telegraphic or telephonic means."**

By 1923, the BBC was operating fully. Great Britain early saw the possibilities in broadcasting, and gave to BBC a monopoly, making Sir John Reith the executive head. Early in 1923 Simultaneous Broadcasting - the linking of several stations to a central program - was introduced (for the first time in the world) as a means of bringing the best programs within the reach of each area.

In 1924, we find Sir John Reith thus defining BBC:

"As we conceive it, our responsibility is to carry into the greatest possible number of homes everything that is best in every department of human knowledge, endeavor, and achieve-

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**Coursey, Philip: "Here in Great Britain", Radio Broadcast, December, 1922, P 123.

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By 1925, there were eight main stations and several relays which made at least one program available to all set owners.

In 1926, the BBC came under a Royal Charter with a board of governors nominated by the government. Sir John Reith continued as the head of the project. The idea of the government monopoly was easily acceptable to the English people. The BBC in its present organization is a definite part of the Post Office Department; the Post Master General is the ultimate authority, but his veto is rare. In 1927 the BBC became a semi-public corporation, still under the Royal Charter.

For a long time, BBC found it possible to give only one program. It must be remembered that of Europe's quota of wave-lengths, Great Britain has only ten, which give her a possible station for each 2,000,000 people.

Under a newer plan, the BBC was able to offer two programs to her people. This was her Regional scheme which combined some of the stations in a chain; some remained local.

 *Schubert, Paul: "This is London calling", Saturday Evening Post, November 9, 1929, P 16.

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quota of wave-lengths, Great Britain has only ten, which

give her a possible station for each 2,000,000 people.

Under a newer plan, the BBC was able to offer two

programs to her people. This was her Regional scheme, which

combined some of the stations in a chain; some remained local.

*Sunderland, Paul: "This is London talking", Saturday Evening

Post, November 9, 1929, p. 16.

A unique feature was the double wave-length allotted to some key stations whereby both chain and local programs could be broadcast.

At present there are about 4,185,023 license holders, and about 28,212 licenses issued free to the blind. There is an estimate of 13,000,000 listeners. The tax is about \$2.50 in United States coin, bringing in about \$5,000,000 a year. (One dollar goes to the Post Office, the rest finances BBC.)

Another source of income is from three weekly publications, The Listener, Radio Times, World-Radio, which list the weekly programs, notes, and diagrams for lectures. This is the only advertising allowed, for there are no commercial programs on the air. The Radio-Times is also put out in the Braille system so that the blind may have information concerning broadcasts.

This nation, as all others under the license system, faces the problem of reaching all owners of sets. As late as September, 1931, "the official estimate for the London area alone was as much as 400,000"unlicensed sets.*

The Company averages 60,000 hours annually on the air to an audience that ranges from one to fifteen million listeners.

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EDUCATION

"The trustees [of BBC] regard themselves as the trustees of an incomparable instrument for the education no less than the amusement of the nation."* Exceptional advantages are given in both music and in other cultural fields of learning. BBC considers especially important the adult education of its nation.

In October 1923, England started the movement of radio in the schools, of which seventy per cent are reputed to use radio; the greatest number of these are elementary schools. However, a Central Council for Schools arranges a definite plan of program, this year marking the third of its existence. Thus, a definite place is made in the curricula for these supplementary broadcasts. BBC therefore estimates the child audience as 500,000 per week; and the adult audience at 1,000 groups per week.

Most of the educational programs are lectures, often on the adult level. Very little music is presented. BBC has been criticised for making its direct appeal to the upper middle class and the aristocracy. Adult education receives regularly about six hours per week.

The license system makes available a definite sum each year. For instance, in 1929 BBC knew it had about \$4,200,000 to budget for programs - educational or enter-

*Greville, Ursula: "Radio in Britain", Musical Quarterly April 1925, P 159.

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MUSIC

Some Music Appreciation has been attempted, Sir Walford Davies being the British Walter Damrosch.

BBC gives about sixty per cent of her national time, and eighty-four per cent of her Regional time to the broadcasting of music. BBC says of this subject:

"In the domain of music there is no secret made of the fact that good music is preferred to bad, nor of the conviction (wonderfully borne out by experience) that the public prefer it too. It is conceived as a privilege and a duty to present certain grand works, to which a concert organization run for local profit could never hope to mount; to popularize - as only this peculiar medium could popularize - the music that is addressed to the finer and quieter sources of emotion in a small audience; to make the British public, not to say the British musical world, acquainted with challenging new work; and to assist opera to overcome the barrier that the cost of presentation has set up between it and its eager multitudinous admirers. At the same time, knowing at least as well as the critics know that the mood for grand music is not upon people at all times and places, such music is kept within reasonable bounds. As to the remaining time given to music and entertainment, let there be no idea that this category is one given grudgingly and under pressure from public or Press..... To provide relaxation is no less positive an element than any other."*

*BBC Year Book, 1928, P 34.

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British programs are planned and balanced for contrast over a number of hours. There are no successions of miscellaneous programs characteristic of the United States broadcasts.

BBC has formed within its organization several chorus and orchestra groups. In 1930, the BBC orchestra was formed with two alternate subdivisions of 79 and 36: 68 and 47. They number 115 in each section.

Some of its musical organizations are:

BBC Symphony Orchestra
 BBC Theater Orchestra
 BBC Light Orchestra
 BBC Bach Orchestra
 BBC Studio Symphony
 Belfast Wireless Orchestra
 The Midland Studio Orchestra
 The Western Studio Orchestra
 Scottish Wireless Orchestra
 The Northern Studio Orchestra
 The Wireless Chorus
 The Wireless Singers
 The National Chorus

The BBC Year Book, 1928, states:

"The effect of broadcasting on the growth of the understanding of music must already have been profound. Literally, millions of people have heard, for the first time in their lives, the simple youthful and sparkling quartets by Papa Haydn, and the elegant Mozart, and the joyful early quartets of Beethoven, and realized that therein lies a wealth of melody hitherto undreamed of; of rhythms that incite the toes to tap as well as any reel or foxtrot."*

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*BBC Year Book, 1938, p. 87.

The BBC Year Book, 1928, gives the following analysis of a typical winter month's program.

MUSIC

Classical:

Opera, Orchestral, Symphonic, Chamber, etc.	10.02%
--	--------

Light:

Light Opera, Comic Opera, Light Orchestral.	11.85%
--	--------

Popular:

Military Band, Musical Comedy, Revue, Entertainers, Ballads.	26.53%
---	--------

<u>Dance:</u>	12.50%
---------------	--------

<u>Gramophone Records:</u>	1.27%
----------------------------	-------

62.17%

DRAMA: Straight Plays	1.69
-----------------------	------

SPECIAL FEATURES

Radio Revels, Round the Continent, Nightingale, Divers, Miners, etc.	1.67
---	------

TALKS

News Bulletins	5.38%
Instructional	14.50%
Poetry and Literature Readings	.95%
	20.83

RELIGIOUS SERVICES	4.18
--------------------	------

CHILDREN'S HOUR	7.40
-----------------	------

MISCELLANEOUS	2.06
---------------	------

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The BBC had first thought to broadcast "purely orchestral and concert transmissions" with occasional news items. "Dance music was first broadcast from an outside dance floor on May 24, 1923, (Carlton Hotel) six months after the BBC began broadcasting. For more than eight years it has continued to be a valued and staple item in the programmes."*

Since 1925 there has been a series of regular chamber music broadcasts; in 1926 the public appearance of the quartet was co-ordinated with broadcast.

In the season 1926-27 a series of national concerts of 150 players was given. Guest conductors included: Elgar, Holst, Strauss, Brecher, Scherchen, Molinari, Honegger, Ansermet, Siegfried Wagner. This season proved so successful that the series was continued another year.

For the last two seasons there have been twenty-three concerts given at "Queen's Hall", some with guest conductors, some with permanent conductor - Adrian Boult. In addition, there have been studio concerts every Sunday evening for the same two seasons, given by various sections of the BBC orchestral group.

BBC has tried to improve steadily the caliber of its music. Percy Scholes was early retained as official critic to the company. He had given fortnightly reviews of BBC programs. Ernest Newman now replaces him.

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From the earliest times opera has been a feature of BBC broadcasts. Light operas have special studio performances. Chorus groups and weekly vocal and instrumental recitals are plentiful.

The BBC spends about \$2,000,000 per year on music compared with the United States' alleged \$10,000,000. The BBC orchestras earn for themselves in the concert field, in addition to their regular budget allowance.

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Broadcasting in Germany began in the fall of 1923- a year later than in England.

In contrast to the highly centralized system of broadcasting in Great Britain, Germany has a series of broadcasting companies which serve definite zones; in a sense, each company is a monopoly in its zone. But the Reichs-Rundfunk-Gesellschaft serves as a "holding company" over all the others - a central force which acts as supervisor in technical difficulties. The ultimate responsibility of radio is in the hands of the Broadcasting Commissioner - the Post Master General.

At present there are twenty-eight stations financed by a license fee of twenty-four shillings from each of the estimated 4,000,000 listeners.

"Under the influence of the government subsidy the tendency has been to develop radio as an educational factor by broadcasting the best music of all ages."*

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"Radio research facilities have been established at the state academies of music. Here the characteristics of broadcast music and the problems of creating new music for radio are studied."*

In Germany, the talent for concert or radio is not concentrated in one area. The various zones are well balanced in their broadcast offerings. However, chain broadcasts are available for gala occasions.

German stations exchange programs, not only with their own zones, but with those of other nations. In the summer of 1931, the Bayreuth performance of Tristan was broadcast over 200 stations in three continents.

In the educational field, Germany broadcasts to about every third school.

"It is said that the broadcasting of German music in Europe has played a large part in bringing her late enemies to an understanding of her great contribution to the world's culture."**

*Ibid, P 19.

**Corbett, E. A.: "Education by Radio", Bul. Vol. 1, #39, Dec. 24, 1931, P 157.

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AUSTRIA

Broadcasting in Austria dates from 1924. Private corporations received licenses to operate under the supervision of the Post Master General.

In both Austria and Germany, the radio is closely associated with Libraries and Museums. In Austria, particularly, pictures and illustrative material are distributed previous to a lecture or an orchestra broadcast.

Talent is concentrated in Vienna, the capital, where two of the six Austrian stations are located and attract international attention.

No advertising is allowed. License fees range from two to six schillings, according to the income of the set owner. At present, the state owns sixty per cent of the stock of the monopolistic central company. There is an estimate of about 371,000 receivers in Austria.

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Hungary has only one station and depends upon outside broadcasts for the most of her programs. There are about 240,000 receivers in use.

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DENMARK

This country should be noted for its wide range of listeners. It reaches about 600 out of each 1,000 people. There is a license fee of ten crowns on each of the 437,244 receiving sets. The government controls the broadcasting situation.

FRANCE

France at present has thirty-one stations which reach about 2,000,000 sets. Foreign programs are preferred.

In its early history the radio field was rather disorganized. Amateurs played a large part in the development. Rivalry between government and privately owned stations has made chain broadcasts impossible, objection being made by the Ministry of Posts and Telegraphs.

Programs until recently were not of a very high type. Advertising is still allowed. Some English phonograph companies have engaged hours for commercial broadcasts, nearness to Great Britain making the venture profitable.

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ITALY

Radio in Italy is under government influence, but is privately owned.

"So far as can be judged, opera is the favourite broadcast in Italy.A Rome station has formed an opera company of about seventy singers."*

About eleven stations serve the 125,000 receiving sets.

OTHER EUROPEAN NATIONS

Since little could be learned of the educational or music content of programs, it is impossible to give details of the systems here. However, as an indication

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of the wide use of the radio, we are including a table which will indicate this, and other small items of information. See Appendix "C", Page 129.

RADIO
IN
SOUTH AMERICA
ASIA
AFRICA
EUROPE
INTERNATIONAL ASPECTS
SUMMARY AND CONCLUSIONS

SOUTH AMERICA

In South American development of radio, Argentina leads, ranking about fourth among the countries of the world in radio history dates far back. In 1903, Argentina was interested in telephony for sea use.

About 1912 a group of amateurs at Buenos Aires were actually broadcasting in opera - the first in any part of the world. But there were no receiving sets at this time.

RADIO

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SOUTH AMERICA

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In 1925, the most popular stations was Radio Cultura, which devoted about forty per cent of its time to advertising, but which also broadcast fine lectures and music concerts.

International Aspects

Summary and Conclusion

Until 1925 there were no license fees, and only amateur control. At present radio is under the supervision of a government department - the Minister of Marine and the Minister of the Interior. Advertising is still employed for revenue, although a stamp tax is levied on the permit to operate.

There are now forty-three stations and about 400,000 sets.

Of the other South American countries, Brazil, Chile, Peru, Uruguay, and Venezuela have the most receiving sets, and station control.

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Of the Eastern people, high literacy is evident only in the Japanese. But other nations are avid listeners and are fully prepared for radio. Zealand began about

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Since 1925 Japan has operated radio steadily. It is really under the monopoly of the Bureau of Communications. A license fee of one yen per month supports the radio stations, each station having a monopoly in its area. For the nineteen broadcasting stations there are about 795,523 sets - an all Japanese audience. \$4.25 to \$5.84 (according to

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Most of the African stations are in Egypt, Algeria, and in the Union of South Africa, representing in all about eight stations and 45,483 receiving sets. Little is known of programs there.

OCEANIA

Radio in Australia and New Zealand began about 1924.

Australian radio until June 30, 1932 will have been in private control. At the above date, the government will assume control.

Australians' dominant interest in education through radio has made them fear the United States' method of financing programs. From \$4.25 to \$5.84 (according to the distance of the receiving set from the station) is the amount of revenue required from the owner.

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INTERNATIONAL ASPECTS

There are about 1,234 stations in the world at present. Almost half of these, 614, are in the United States. The other 620 are distributed over the rest of the world population.

The newest way of linking the various stations and nations of the world has been through rebroadcasting after pick-up on short waves. The latter have had a curious history in the United States.

When it became necessary to adjust the number of stations in the United States, in 1927, amateurs were pushed into the short-wave area, presumably a barren field. Much to their surprise they were heard at phenomenal distances. As early as 1922, Marconi, in a visit to the United States, urged experimentation and research on the short wave area.

Rebroadcasts have been popular since 1925, when it was first found that continents could be linked together. Some of these have become regular features, and may be classed as educational in matter, since programs are prepared which will foster an international good-will through informational lectures. Little music has been attempted on these programs.

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Certainly the radio has been successful in reaching this large number of people, of having at least this potential audience within fifteen years of its popular use. The detailed list of the distribution of radio receiving sets for the world is in a table, Appendix "C".

Premier Baldwin, in an address given in Guild Hall, London, in the fall of 1928, said:

"I believe wireless, common or garden wireless, will be one of the greatest bonds between the common peoples of the whole world. We in England used to regard every one who lived across the seas as savages. Now, when most people realize that in whatever country of Europe man lives he is a human being like himself, with a family and a family life, with a wireless set with service on Sunday and dancing in the evening and lectures, then war presents a very different aspect."*

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(Continent)	(No. of Sets)
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The detailed list of the distribution of radio receiving sets for the world is in a table, Appendix "C". It indicates the extent to which this sound-reproducing device is used, and serves as an indication of the potential spread of music. The universal quality of music, so often cited, is a reality in this medium -- Radio.

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ELECTRICAL TRANSCRIPTIONS

Introduction

Electrical energy was early employed for musical purposes in 1876 for the mechanism of an organ - by Charles Spencer Baker.

In 1897, Thaddeus Cahill, an American inventor registered a patent for his first electrical music apparatus with 'sound staves'. This was a bulky instrument and had no salient features. The invention of this apparatus was the portable playing device which could be attached

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to any piano for the purpose of making the strings vibrate - accomplished by electro-magnetic induction.

Introduction

Electrical Instruments

Another of Cahill's inventions was an electric organ of similar design, an American inventor and

Electrical Recordings

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New Tone Colors

instrument which could be used for therapeutic purposes, with electrical sound waves of varying force and intensity.

Facsimile Broadcasts

Later experiments were automatic pianos, phonographs, and orchestrions.

Scientist-musicians are now using electricity as the basis of a musical art by designing musical instruments dependent upon this unique force.

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One of the electrical instruments which is in direct relation to the radio discoveries is the 'electric organ' - Schillinger, Joseph: "Electricity, a Musical Language", Musical Quarterly, March-April 1931, p 23.

ELECTRICAL TRANSMISSIONS

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Another step after Cahill's invention was an electric organ by Wilbur Farrington, an American inventor who after twenty-five years of experimentation "built an instrument (at present used for therapeutic purposes) with electrical sound waves of varying form and intensity."*

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It was invented in 1919 by a Russian scientist-musician, Theremin, and introduced to the buying public in the autumn of 1929. The instrument resembles a radio, but is played by electrical sensitivity of the human being, which sets sound waves in motion according to bodily movement, the tone being augmented by the radio-amplifiers. In the original model, the uncertainty of finding exact distances which determines the pitch was a weak feature. RCA demonstrated the Theremin at the world's fair - radio - at Madison Square Gardens, New York City, in September 1929, in the hope of commercializing the project.

Latest models have added a keyboard and finger control.

Solo demonstrations have excited curiosity, but little stable enthusiasm. There have been instances of its use in radio orchestral concerts; its peculiar penetrating tones were thought to be a happy substitute for the lowest bass strings.

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Bechstein, in 1931, produced a combination piano, spinet, harmonium, phonograph, and radio. This German model, a Claviphone, was to have been introduced to the United States.

Other instruments are reported as inventions on the electric principle - one, a Dynaphone by René Bertrand, Hugoniot, and Givelet. A German inventor, Dr. Trautwein, has presented an instrument which he has called Trautonium. He is a writer for the German magazine, FUNK, and is active at the research laboratories, radio division, of the Berlin State Conservatory.

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An electrically transcribed program is one that has been recorded at some central point: in the radio field, copies are distributed among the stations one wishes to reach - a tactic called syndication of the record. These same records may be used for educational purposes, in the schools, or on an electrical phonograph.

That the transcriptions are growing in popularity is shown by the report that "more than seventy-five regular weekly electrical transcription programs were on the air under commercial sponsorship at the beginning of this year."*

Until February 15, 1932, electrical transcriptions and phonograph records had to be clearly stated as such. A new FRC ruling somewhat relaxed the stringent restrictions.

These electrical transcriptions are made on wax discs just like any other record, and are made to revolve in $33 \frac{1}{3}$ revolutions per minute, the rate of the new slow playing records recently presented to the phonograph public. A double outlet is assured here.

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Closely allied to both Television and to electrical transmissions is FACSIMILIE BROADCASTING. "This is a process of transmitting drawings, text or other graphic material by radio to appropriate receiving sets in the home or school where such material is reproduced."*

Europe and the United States have tried and have abandoned this type of broadcasting through lack of public support. There is also a need of international regulation upon what may or may not be revealed in this medium.

It has been suggested that electrical transcriptions may replace the short wave broadcasting which had been expected to present an international aspect to radio. But the field is too new to be sure, as yet.**

Certainly the phonograph and radio fields are permanently tied through this new process. We cannot begin to speculate upon the possibilities for new orchestrations or new instruments.

*Tyson, L:Editor, "Present and Impending Applications to Education of Radio and Allied Arts". Second Edition, revised, of publication by Nat. Adv. Council on Radio in Education, N.Y., 1932, P 43,

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SOUND MOTION PICTURES

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General Development

Who called his...

Educational use in U.S.

About 1907... former employee of Edison... German Sound Films in London.

Foreign Educational Use

German Sound Films

Conclusion

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In 1906, Edison again experimented - this time producing his synchronophone, but it gradually sank into disuse.

On February 17, 1913, he presented a Kinetophone for a premiere. This was an advance over anything yet produced, but still no commercial use was made of the instrument.

Edison, Will. N.Y. See and Hear. P. 11.

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About 1923, Lee deForest presented his Phonofilm, an important advance towards modern talkies.

Success in the French field was first achieved by Léon Gaumont, head of the French cinematograph establishment bearing his name: 1902 was his first successful year. But in 1910, a chronophone, his new invention, received the approval of the French Academy of Science. Excerpts from operas, ballets, etc., have been recorded and projected by this machine.

In the early days of the cinema, Sigmund Lubin, a native of Philadelphia, rented with his films gramophones and records to accompany these motion pictures. In the very early houses were also used Wurlitzer Band Units. There was still one house in Philadelphia (1929) that employed this electrical apparatus for the musical accompaniment.

As early as such a production as "The Birth of a Nation", there were indications that the producers were seeking the use of synchronization. In this particular picture, a score was assembled and presented to the theatres for use in creating proper mood. The fact that some theatres would or could not use the suggested score brought

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Several groups experimented.

The Bell Telephone Laboratories investigated in two fields: the recording of sound on discs, synchronized with film, and also the recording of sound on the edge of the film itself.

The Warner Brothers, seeing the Bell experiments, and believing firmly in the future of sound, received a license in April 1926 from Western Electric to produce talkies under its system of patents. Warner Brothers used the disc, and called their device the Vitaphone.

*Rapée, Erno: "Future of Music in Moviedom", Etude, September, 1929. P 650.

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Preliminary to releasing a long feature, Warners experimented with a half dozen short subjects to be released at their only sound-equipped theatre at Broadway and Fifty-second Street, New York City. On August 6, 1926, came the premiere. The short subjects included songs by Martinelli, Marion Talley, and Anna Case, violin solos by Zimbalist and Elman. The feature picture was "Don Juan" synchronized by the New York Philharmonic Orchestra under the direction of Henry Hadley.

Intense interest was aroused. More short pictures were synchronized. In six months one-hundred theatres were equipped with sound.

The Jolson picture - mostly singing - which was introduced in October 1927 was an instant success.

In June 1926, Fox-Case Corporation presented their sound-on-film device - the Movietone. News films were their first releases, and in January 1927 at their premiere, in addition to "What Price Glory", songs by Raquel Meller were reproduced. In May 1927, a film "Seventh Heaven" was presented, fully synchronized.

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By 1929 three French cinema companies were using mechanical accompaniments.

With the advent of the synchronized film, accompaniments of mechanical music were revived. The Leger-Murphy absolute film, "Ballet Mechanique", was originally conceived with an accompaniment of electrical pianos composed by George Antheil.

In Paris, studio 28, Les Agriculteurs, sound was obtained by gramophone records and an electric Pleyela. Cine-Latin, another cinema house, employed an electromagnetic melodium, amplified by loud speakers.

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By 1928 all the major studios were preparing to produce sound films. In the fall of 1929 over 5,000 United States theatres were equipped to receive these new films. Music included in these pictures was expertly played, quite a change from the "picked-up" or character of some of the city theatres. However, these theatres, poor as they may have been, had prepared the audience for the mode of musical extravaganzas.

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By 1929 three French cinema companies were using mechanical accompaniments.

With the advent of the synchronized film accompaniments of mechanical music were revived. The latter Murphy absolute film, "Ballad Mechanique", was originally conceived with an accompaniment of electrical pianos composed by George Antheil.

In Paris, studio 28, Les Agriculteurs, sound was obtained by gramophone records and an electric Pleyel. Cine-Latin, another cinema house, employed an electro-magnetic mechanism, amplified by loud speakers.

Two Danish scientists - Axel Peterson and Arnold Paulson - have an invention registered under the name of British Acoustic Films, and under the management of the Gaumont Company. The first actual public use of British Acoustic Films was in the play "Marygold" at the Kinsway Theatre, London. British Acoustic Films and Brunswick are co-operating in research.

From 1929-1931, concentration was upon dialogue. But later in 1931, music was beginning to be used as a mood creator, and as a transitional factor. All recording is electrically done. Amplifiers give the necessary volume.

The phenomenal development of this sound-sight medium is certainly due to the high perfection already reached of the silent film photography, together with the influence of electrical transcriptions engendered in the sound field.

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indication of trend and of difficulties to be met by the music directors.

The answers to the questionnaires gave this general information:

1. All agreed that from ninety to one-hundred per cent of all pictures (full length features, short features, or educational films) contained music of some kind.

2. "Dramatic" use of music, i.e., a selection of music accompanied by action was rarely used, by some studios not at all.

3. Of the music used in the films, classical music composes from twenty-five to seventy-five per cent. Columbia reports that "foreign silent versions use about ninety per cent standard music, ten per cent popular."*

4. Most of the studios have synchronized scores to the foreign silent versions of domestic talking pictures.

5. First National Studios were the only producers who claimed presentation of vocal and instrumental soloists and symphony orchestras - but these pictures were rare.

6. In the educational children's films there was no attempt to use the better type of music.

7. Estimates of the number of people viewing the pictures of any one studio's pictures could not be made.

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8. The amount of music used in talking pictures varies. Columbia estimated from two to five per cent; Paramount claimed about one-third of the picture was music; RKO-Radio gave fifteen per cent as the figure.

The questionnaires included some interesting comments on the use of music in talking pictures.

Mr. Nathaniel Finston, head of the Music Department of Paramount Publix Corporation, says:

"Music is becoming increasingly important in the production of sound pictures. Producers are learning that proper background music is as important to a talking picture as the symphony orchestra in the silent picture days was to the de-luxe theater."

Mr. Max Steiner, General Musical Director of the RKO Radio Studios, says:

"Music is a universal language and will always have its place in any kind of entertainment, either on the stage or the screen. At the present time the motion picture industry shows a trend towards putting more and more music into their pictures. I believe that within six months (from November 11, 1931) we will make musical pictures again, but it is my conviction that a newer and better technique will be used." (Letter to writer).

Mr. David Mendoza of the First National Studios gives this information:

"In the talking picture, music is very unimportantly incidental, but in the synchronized silent picture

the music served to accentuate mood -- drama and dynamics. Some day, in the future, a blending of Dialogue and Music will produce the perfect form of entertainment but till now - the medium is still in the experimental stage". (Letter to writer).

A most interesting phase of scoring for pictures was brought out in the following communication from Miss Leslyn MacDonald, of the Music Department of the Columbia Pictures Corporation:

"The status of music in pictures today is undergoing a great change at just this time; whether or not there will be a return to more music in pictures, or a use of still less is a matter for conjecture of the Trade papers. What music is used is being scored with greater care and discrimination as to its necessity and significance for the general dramatic effect, rather than with the wholesale "spotting" of songs as during the early days of the "musicals". Some excellent examples of this new use of music may be noticed in "Street Scene", "The Yellow Ticket"*, "Heart in Hand", "Transatlantic"*, "Heaven on Earth", and our own "Platinum Blonde"*.

"A film which uses the story of significance of a composition as its themeis considered a "dramatic" use of the music, and is expressly excluded from the larger producers' contract with Electrical Research Products Inc. and the American Society of Composers Publishers and Authors. Such a use requires a special license, and as it uses the music to a greater extent than an incidental license and there is deemed worthy of greater royalty payment. The variance between

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copyright situations in this country and abroad is such that the producers are somewhat wary of using classical compositions which may, upon exportation of the picture, turn out to be heavily protected in Europe, while in the public domain in America. Some examples of such compositions are "The Blue Danube Waltz", all of Gilbert and Sullivan's melodies, Grieg's "Peer Gynt Suite". Only lately have the compositions of Chopin been released to the public domain for the world." (Letter to the writer).

The above statement by Miss MacDonald would seem to indicate one important reason for the avoidance of the classical type of composition - protection from legal entanglements. The copyright laws of the United States are at variance with the laws of European countries. Recent attempts to legislate have been blocked by different organized groups. While it is a distinct advantage to have heavy protection, the copyright laws on the reproducing of the best music have succeeded only in making license fees prohibitive.

Other directors of studio music have varying ideas on the function of the scoring in pictures.

Arthur Kay of the Fox studios has the ideal of an impressionistic accompaniment through the whole picture.

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We must have music to sustain the interest of the audience."*

Mr. Erno Rapee, formerly of the First National Studios, seems to sum up the situation when he says: "The main thing about the music of the picture is that it be identical with the main purpose of the picture itself. It is the picture as a whole and the score as a whole, the tout ensemble which really counts."**

If music for the films has been at times petty and uninteresting, we must remember that the time between the completion of a picture and its release is so short that little original work can be contributed. At best, the scores must be an assembly of known music, adequately protected "from the copyright owners". Too, films are short-lived, and the effort of producing an original score is hardly justified by its short life. The prevailing monotony of choice of selections is somewhat explained by the need of abundant melody for reproducing music successfully: few compositions of worthy content contain melody with the desired emphasis, and the few that are available are used again and again.

Education

The motion picture industry is primarily concerned with entertainment, and as we have seen, the music used

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Some educational films are produced: for instance, operatic shorts - two-reel operas - are to be released for educational use. But studios release very few in proportion to their other features, since box-office receipts are of the first interest. Managers insist that educational features do not bring adequate funds or large audiences. Welfare Leagues insist that educational films, well advertised and pointed out as such, are well attended.

There is evidence that some of the motion picture trade magazines, notably the Motion Picture Herald, have formed departments whose work it is to draw attention to the best and most educational pictures with the following aims in mind:

"To encourage children to see the best things of the screen, thereby leaving them less time and money for the poorer kind.

"To have the entertainment screen contribute directly and constructively to their education.

"By winning support for high type pictures to offer an incentive to producers to make more of the same kind".*

It is interest of this sort that can bear some weight on the whole ensemble of the film - content, score.

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Visual education is becoming a part of the school curriculum. Some companies have good portable talking-film projectors.

Foreign Educational Ventures

Europe has not yet become "moving picture minded". British films are, on the whole, still very crude. Nor does Great Britain hold any great opinion of the general educational value of moving pictures.

Italy, on the other hand, has divided her country into nineteen provinces with as many libraries for the schools: travelling exhibitors supplement the regular curriculum.

France is also keenly interested in the educational aspect of the films. As early as 1926 there were from 16,000 to 18,000 projectors in schools and other educational institutions: there is also a national cinema organization of which the scientific side is highly developed. Prominent French composers, Milhaud, Honneger, Satie, have interested themselves in arrangements for films. The latter has favored repetition of rhythmic and melodic figures to accent character and mood. The general idea of the French composers is to have the music prominent - the acting merely a part of the emotional quality. This is of course contrary to the usually understood place of music in American films where music is an incidental accompaniment.

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German Sound Films

Meydam, a German film magnate, estimates the number of sound theatres in Germany to be 3,500; only 200 silent theatres are operating.

Ufa makes pictures in both France and Germany and in addition distributes in Europe and the Americas. It is the largest of the German companies, controlling about 110 theatres in that nation.

In Germany the film operetta is being experimented with. In addition to the Kulturforschungs Institut in Berlin, a special cinema office has been established to approve artistic, educational and cultural films.

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GENERAL CONCLUSION

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There is an estimated weekly moving picture audience of 90,000,000 people - men, women, children - in the United States alone: in the world, 250,000,000.

On the books of the film distributors there are about 22,000 theatres for the United States: 13,223 are equipped with sound apparatus; the rest are prepared to show only silent films. Every week the thirty key-cities (the principle cities of the nation) which contain about 180 sound-equipped theatres report their receipts as varying from \$2,000,000 to \$2,500,000. The world theatres number about 50,000. This seems to indicate that the sound moving pictures are a popular source of entertainment. While the music included in these presentations is usually of the lighter type, again we have an audience being exposed to the art. The tendency of the Musical Directors to include more extended scores of the better grade of music must automatically affect the listeners to a favourable response from constant exposure to it.

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About 1860 Ernst Ruhmer, on the basis of an imitation of Carey's, transmitted some small figures. This was a German experiment. In 1873 William Byrd Smith, a cable operator made some important experiments.

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One of the first television patents was taken out by Paul Nipkow, a German, in 1884. Nipkow, in the early years, made suggestions which were later taken up by the American Telephone and Telegraph Company. In the 1907 demonstration, Dr. Alexanderson, consulting engineer of the General Electric Company and of RCA, has given an exhibition of television based upon the initial experiments of Nipkow.

The images sent over the wires, at first, were in black and white and shades of gray.

Prominent scientists of to-day interested in this new art are J.J. Baird, Max Diekmann, G. Francis Jenkins and von Wehaly, all of whom have demonstrated their particular version of sending images.

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Radiomovies and Radiovision have been the ready instrument of Jenkins. He solicited the aid of amateurs, and began on July 2, 1928 to regularly broadcast radiomovies that he might obtain their comments on reception, and perfect his devices.

Both Phonograph and Radio industries are interested in this new proposition. The Gramophone Company has given an exhibition of a British invention: RCA in the United States seems to be the most active exhibitor.

In this country, Television companies are being rapidly formed. There are two groups of experimenters: the Radio Business, and private interests. The Federal Radio Commission grants only temporary licenses, as yet, and does not recognize Television as a medium for advertising. Consequently there has been no commercial sponsorship of the experiments.

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However, the Radio Companies are preparing for the use of Television in their broadcasts. Of the twenty-nine Television stations now operating in the United States, eleven are licensed by RCA. The other chain - CBS - has of late entered the experimental broadcasting field. Already there is an estimated audience of 8,000 to 25,000.

About the first station to broadcast Radio and Television programs was WOR, in November 1927. In 1928, WEAJ went on the air with images. In January of that year, Alexanderson gave his first demonstration in Schenectady, New York. In 1928, there were about ten stations giving regular Television broadcasts.

In 1927 there was only one-way Television. In 1931, two-way images were sent.

Mergers of the Sound Motion Picture and Radio Industries seem to point the way to the use of Television as a definite entertainment medium of the future. It has been predicted for wide public use within the next ten years. When it does appear, the Sound Motion Pictures will have prepared the people for the mechanical reproduction of both sight and sound.

Radio City - that latest project for a miniature city in the heart of Manhattan - is prepared to house every kind of sight and sound performance.

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With the appearance of sight with sound upon the Radio, the spoken word may take precedence over Music. But until Television, or Radiovision, does appear more generally, music will probably continue to hold first place in the entertainment field.

graph, radio - and the newer sound-sight reproduction media, has served as an ever growing influence upon people. In search of entertainment, audiences have grown larger and larger. The appeal has been international, not local.

So far, the Phonograph has most consistently made available the greatest amount of the best in music. But it finds fewer contacts with the public than does the Radio or the Sound Motion Picture. These latter fields are the mass producers of music.

The tendency at present is toward a higher musical standard. Although we should be content that these various devices, in a short span of fifty years, have made the public musically-minded, there is still much to be desired. There must be a greater sensitiveness to the cultural side of music. Big Business must be willing to foster that ideal.

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APPENDIX A

Mergers

Prominent at the head of one series of mergers is the Radio Corporation of America, incorporated in 1919. It has allied itself with almost every field of sound and sight reproduction. It controls about 4,000 patents, and its latest venture is the proposed Radio City to be built in New York, and equipped to house twenty-seven broadcasting studios, television and moving picture facilities, theatres, opera.

APPENDICES

Some of its mergers follow:

A: Mergers

RCA and Victor Talking Machine Company (1928)

B: Distribution of Radio Sets

RCA and R.M. in the United States

RCA-Victor and RCA-Photophone (1932)

C: Summary of World Radio

It is closely associated with Goldwyn-Meyer

Nation Picture Studios, and with the Radio-Pathe, and Radio-BRD studios. It controls radio stations WEAF, WOR, WJZ. Until February 1932, RCA had controlled the Leo Feist and the Carl Fischer Music Companies, but these have now reverted to their former owners.

Other mergers have been executed by Columbia Phonograph Company. It owns the CBS chain of broadcasting. It has contractual agreements with Paramount-Famous-Lasky Motion Picture Company which gives to the latter a share in profits up to 12 1/2 per cent. British Columbia Phonograph Company has until 1932 controlled the American branch, but after the recent merger of B.M. (Gramophone Company, England) the American Columbia was forced into an agreement with

APPENDICES

- A: Mergers
- B: Distribution of Radio Sets
in the United States
- C: Summary of World Radio
Stations and Sets

APPENDIX A

Mergers

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Some of its mergers follow:

RCA and Victor Talking Machine Company (1928)
 RCA and General Motors (1929)
 RCA and R.K.O. (1928)
 RCA-Victor and RCA-Photophone (1932)

It is closely allied to the Metro-Goldwyn-Mayer Motion Picture Studios, and with the Radio-Pathé, and Radio-RKO studios. It controls radio stations WEA, WOR, WJZ. Until February 1932, RCA had controlled the Leo Feist and the Carl Fischer Music Companies, but these have now reverted to their former owners.

Other mergers have been executed by Columbia Phonograph Company. It owns the CBS chain of broadcasting; it has contractual agreements with Paramount-Famous-Lasky Motion Picture Company which gives to the latter a share in profits up to 12½ per cent. British Columbia Phonograph Company has until 1932 controlled the American branch, but after the recent merger of HMV (Gramophone Company, England) the American Columbia was forced into an agreement with

APPENDIX A

Mergers

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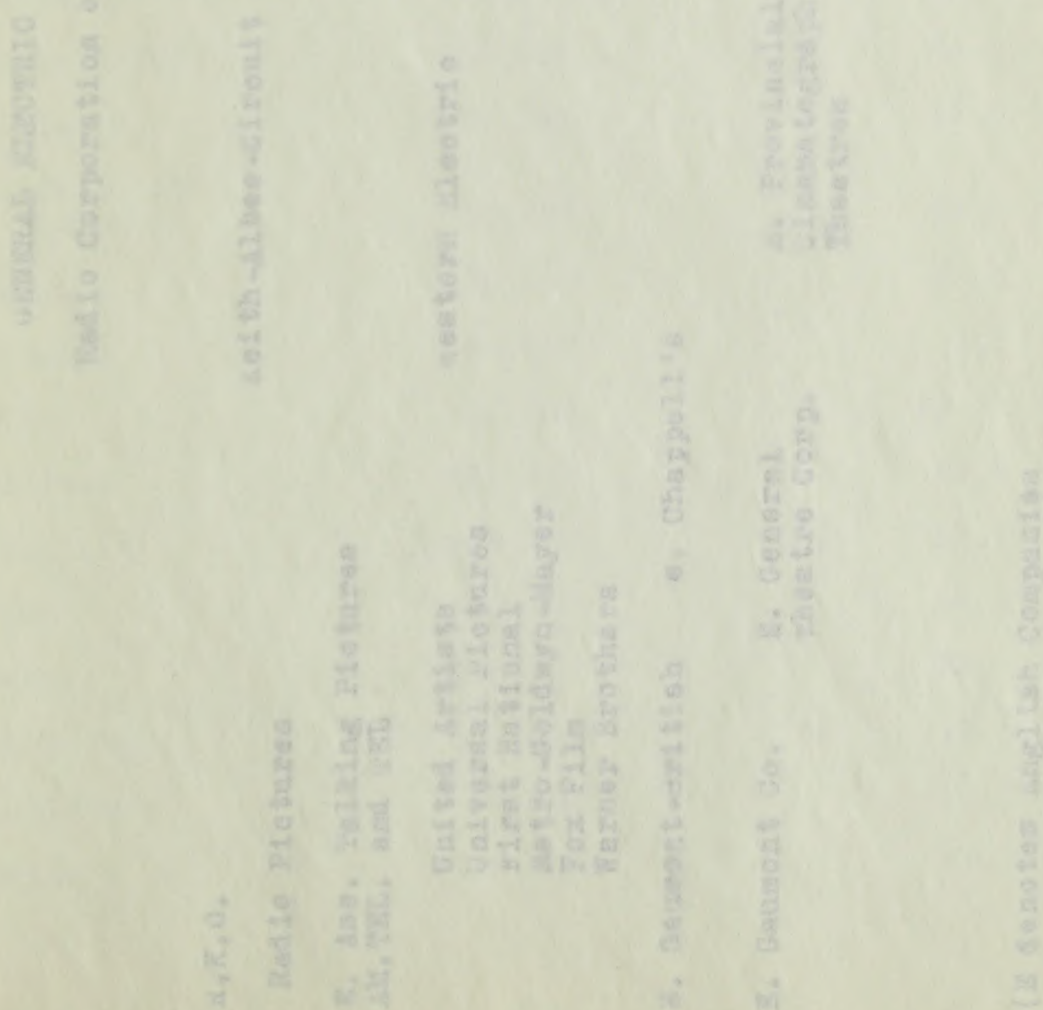
Other mergers have been executed by Columbia Phonograph Company. It owns the CBS chain of broadcasting; it has contractual agreements with Paramount-Panama-Lasky Motion Picture Company which gives to the latter a share in profits up to 12 1/2 per cent. British Columbia Phonograph Company has until 1932 controlled the American branch, but after the recent merger of HMV (Gramophone Company, England) the American Columbia was forced into an agreement with

Grigsby-Grunow, a combination known as Columbia-Majestic. There is an international chain of Columbia Phonograph Companies - which has been the result of mergers of or contractual agreements between foreign Phonograph Companies and Columbia.

In 1930, Brunswick, which represents both Radio and Phonograph interests, merged with Warner Brothers (Vitaphone).

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There is a close alliance in all fields. The extent of the English and American co-operative undertakings may be more easily seen in the diagram on the following page.



Brigade-Growth, a combination known as Columbia-Majestic.
 There is an international chain of Columbia Phonograph
 Companies - which has been the result of mergers of or
 contractual agreements between foreign Phonograph Companies
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-- --

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 following page.

GENERAL ELECTRIC COMPANY

Radio Corporation of America

R.K.O.

Radio Pictures

E. Ass. Talking Pictures
AM.TEL. and TEL

Keith-Albee-Circuit

Victor Gramophone Co.

E. Gramophone Co. (HMV)

United Artists
Universal Pictures
First National
Metro-Goldwyn-Mayer
Fox Film
Warner Brothers

Western Electric

E. Gaumont-British e. Chappell's

E. Gaumont Co.

E. General
Theatre Corp.E. Provincial
Cinematograph
TheatresE. Ass.
Provincial
Picture Houses
E. Columbia
Gramophone Co.Columbia Phono-
graph Co.(USA)

(E denotes English Companies)

2. 222.
KROVNIY
KROVNIY

LEONARD, J.
GTON ATTORNEY

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В. И. Леонидов, 9
Надгробный, 2

[illegible]

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

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SYSTEM TO NO. 18709700 OF 1988

Appendix BDistribution of radio Receiving Sets
in the United States

Census Bureau, 1930

State	Number of Sets in families	Per cent of total families owning sets
Alabama	56,491	9.5
Arizona	19,295	18.1
Arkansas	40,248	9.2
California	839,846	51.9
Colorado	101,376	37.8
Connecticut	213,821	54.9
Deleware	27,183	45.8
District of Columbia	67,880	53.9
Florida	58,446	15.5
Georgia	64,908	9.9
Idaho	32,869	30.3
Indiana	351,540	41.6
Illinois	1,075,134	55.6
Iowa	309,327	48.6
Kansas	189,527	38.8
Kentucky	111,452	18.3
Louisiana	54,364	11.2
Maine	77,803	39.2

Appendix B

Classification of States according to the number of States in the United States

Current estimate, 1900

State	Number of States in the United States	Per cent of total population
Alabama	36,221	9.6
Arizona	10,273	18.1
Arkansas	22,123	9.2
California	120,243	21.9
Colorado	111,271	27.8
Connecticut	212,221	22.2
Delaware	27,123	22.2
District of Columbia	27,223	22.2
Florida	22,123	12.2
Georgia	22,123	9.2
Idaho	22,123	20.2
Indiana	221,223	21.2
Illinois	1,222,123	22.2
Iowa	222,223	22.2
Kansas	122,223	22.2
Kentucky	111,223	12.2
Louisiana	22,223	11.2
Maine	27,223	22.2

Appendix B, continued

State	Number of sets in families	Per cent of total families owning sets
Maryland	165,465	42.9
Massachusetts	590,105	57.6
Michigan	599,196	50.6
Mississippi	25,475	5.4
Missouri	352,252	37.4
Minnesota	287,880	47.3
Montana	43,809	32.0
Nebraska	164,324	47.8
New Jersey	625,639	63.4
New York	1,829,123	57.8
Nevada	7,869	30.6
New Hampshire	53,111	44.4
New Mexico	11,404	11.5
North Carolina	72,329	11.2
North Dakota	59,352	40.8
Ohio	810,767	47.7
Oklahoma	121,973	21.6
Oregon	116,299	43.5
Pennsylvania	1,076,770	48.1
Rhode Island	94,594	57.1
South Carolina	28,007	7.7
South Dakota	71,361	44.2
Tennessee	86,229	14.3

Appendix A, continued

State	Number of sales in families	Per cent of total families owning cars
Alabama	100,000	6.0
Alaska	200,000	0.5
Arizona	100,000	0.5
Arkansas	50,000	0.5
California	200,000	0.5
Colorado	100,000	0.5
Connecticut	50,000	0.5
Delaware	100,000	0.5
District of Columbia	100,000	0.5
Florida	100,000	0.5
Georgia	100,000	0.5
Idaho	100,000	0.5
Illinois	100,000	0.5
Indiana	100,000	0.5
Iowa	100,000	0.5
Kansas	100,000	0.5
Kentucky	100,000	0.5
Louisiana	100,000	0.5
Maine	100,000	0.5
Maryland	100,000	0.5
Massachusetts	100,000	0.5
Michigan	100,000	0.5
Minnesota	100,000	0.5
Mississippi	100,000	0.5
Missouri	100,000	0.5
Montana	100,000	0.5
Nebraska	100,000	0.5
Nevada	100,000	0.5
New Hampshire	100,000	0.5
New Jersey	100,000	0.5
New Mexico	100,000	0.5
New York	100,000	0.5
North Carolina	100,000	0.5
North Dakota	100,000	0.5
Ohio	100,000	0.5
Oklahoma	100,000	0.5
Oregon	100,000	0.5
Pennsylvania	100,000	0.5
Rhode Island	100,000	0.5
South Carolina	100,000	0.5
South Dakota	100,000	0.5
Tennessee	100,000	0.5

Appendix B, continued

State		Number of sets in families	Per cent of total families owning sets
Texas	2	257,686	18.6
Utah	0	47,729	41.1
Vermont		39,913	44.6
Virginia	0	96,569	18.2
Washington		180,229	42.3
West Virginia		87,469	23.4
Wisconsin	1	364,425	51.1
Wyoming		19,482	34.0
Canada	54	12,078,345	40.3
French West Indies	8	100	Annual fee, 10 francs, (\$39 cents)
Greenland	0	25	No fee. broadcaster supports the station (stateur)
Guatemala	8	350	Installation fee, 5 quetzales (\$5.00)
Haiti	1	1,000	The single station is devoted to education, no fee: government monopoly.

Total number of families in the United States was 29,980,146. Population per family was 4.1. Estimated number of listeners - 50,000,000.

Appendix A. continued

State	Number of persons in families	Per cent of total families owning cars
Texas	251,448	10.6
Ohio	49,771	11.1
Illinois	20,910	11.0
Virginia	95,021	10.8
Washington	180,287	10.3
West Virginia	67,607	10.4
Wisconsin	201,423	11.1
Wyoming	19,622	10.0
	12,078,265	10.3

Total number of families in the United States was 29,900,000. Population per family was 4.1. Estimated number of persons - 80,000,000.

APPENDIX CSummary of World Radio
North America

Nation	Stations	Sets	Information
Alaska	2	1,500	U.S. regulations
Bahamas	0	300	Broadcasting is forbidden. License fee for sets, 5 shillings, (\$1.21.)
Barbados	0	250	Radio began in 1925. A license is required. The stations are supported by the broadcaster.
Bermudas	1	700	Station supported by broadcaster.
British Honduras	0	82	Station supported by broadcaster.
Canada	84	284,580	See Page 75.
Canal Zone	0	300	No fee. Under U.S. Military regulations.
Costa Rica	2	250	Broadcasting began about 1920. Supported by the broadcaster.
Cuba	70	28,875	Steady progress. See Page 74.
Dominican Republic	1	1,375	No development. The stations are controlled by the government. No fee.
French west Indies	0	100	Annual fee, 10 francs, (39 cents)
Greenland	0	25	No fee. Broadcaster supports the station. (amateur)
Guatemala	3	250	Installation fee, 5 quetzals (\$5.00)
Haiti	1	1,000	The single station is devoted to education. No fee: government monopoly.

APPENDIX C

Summary of World Radio
North America

Nation	Stations	sets	Information
Alaska	2	1,500	U.S. regulations
Bahamas	0	300	Broadcasting is for- bidden. License fee for sets, 5 shillings, (\$1.21)
Barbados	0	250	Radio began in 1925. A license is required. The stations are supported by the broadcaster.
Bermudas	1	700	Station supported by broadcaster.
British Honduras	0	82	Station supported by broadcaster.
Canada	84	284,580	See Page 75.
Canal Zone	0	300	No fee. Under U.S. Military regulations.
Costa Rica	2	250	Broadcasting began about 1920. Supported by the broadcaster.
Cuba	70	22,875	Steady progress. See Page 74.
Dominican Republic	1	1,375	No development. The sta- tions are controlled by the government. No fee.
French West India	0	100	Annual fee, 10 francs, (39 cents)
Greenland	0	25	No fee. Broadcaster supports the station (master)
Guatemala	3	250	Installation fee, 5 quetzals (\$5.00)
Haiti	1	1,000	The single station is devoted to education. No fee: Government monopoly.

North America, continued

Nation	Stations	Sets	Information
Honduras	2	86	No fee. Broadcaster supports. Poor climatic conditions.
Jamaica	0	250	No license but an installation fee required.
Mexico	39	100,000	See Page 74.
Miquelon	0	100	Annual fee, 10 francs.
Netherland W. Indies	0	50	Climate is bad for radio reception. Broadcaster supports.
Newfoundland, Labrador, St. Johns	6	1,375	Radio is popular. Broadcaster supports.
Nicaragua	0	50	Little development. An installation fee required.
Panama	0	300	Broadcasting forbidden. Permits for listeners are \$2.50.
Porto Rico	-	5,000	U.S. regulations.
Salvador	1	1,000	Government monopoly. An installation fee of \$5.00 and annual fee of \$18.00.
Trinidad, Tobago	-	40	Fee varies from 10 shillings to a pound (\$2.43 to \$4.87.)
United States	614	12,078,345	See Pages 44-73.
Virgin Islands	-	50	Under United States regulations.
<hr/> 12,506,233 <hr/>			

North America, continued

Station	Stations	Rate	Information
Honduras	2	85	No fee. Broadcaster supports. Poor climatic conditions.
Jamaica	0	250	No license but an in-station fee required.
Mexico	32	100,000	See page 74.
Nicaragua	0	100	Annual fee, 10 times.
Netherlands W. Indies	0	50	Climate is bad for radio reception. Broadcaster supports.
Newfoundland, Labrador, St. John's	6	1,375	Radio is popular. Broadcaster supports.
Nicaragua	0	50	Little development. An installation fee required.
Panama	0	300	Broadcasting forbidden. Permits for listeners are \$2.50.
Porto Rico	-	5,000	U.S. regulations.
Salvador	1	1,000	Government monopoly. An installation fee of \$5.00 and annual fee of \$18.00.
Trinidad, Tobago	-	40	Fee varies from 10 shillings to a pound (\$2.43 to \$4.87).
United States	614	12,078,343	See Pages 44-73.
Virgin Islands	-	50	Under United States regulations.

12,000,000

South America

Nation	Stations	Sets	Information
Argentina	37	400,000	No fee. Sets are registered. See Page 92.
Bolivia	1	100	Allow 5-minutes per day for advertising. The listener supports with a fee of \$12.25. Monopoly.
Brazil	20	190,000	Installation fee-\$2.40. Poor climate.
British Guiana	1	25	No data.
Chile	7	35,000	Register the sets, but no fee required.
Colombia	8	500	Radio began in 1929.
Ecuador	1	150	Receiving sets must belong to members of the radio clubs. Poor climate.
Falkland I.	0	16	Little progress.
Fr. Guiana	0	8	Poor climatic conditions.
Paraguay	1	150	Poor climate.
Peru	3	70,000	Great interest in radio. Government owns and operates the stations. A few of \$4.87 required.
Surinam	20	18	No data.
Uruguay	27	18,865	Broadcaster supports. Fine interest.
Venezuela	3	2,500	Fee of 60 bolivars per year (\$11.58.)
		<hr/> 721,826	

South America

Information	Stations	Notes
Argentina	37	No fee. Sets are registered. See Page 92.
Bolivia	1	Allow 5-minutes per day for advertising. The listener supports with a fee of \$12.85. Monopoly.
Brazil	20	Installation fee-\$2.40. Poor climate.
British Guiana	1	no data.
Chile	7	Register the sets, but no fee required.
Colombia	8	Radio began in 1929.
Ecuador	1	Receiving sets must be long to members of the radio clubs. Poor climate.
Falkland I.	0	Little progress.
Fr. Guiana	0	Poor climatic conditions.
Paraguay	1	Poor climate.
Peru	3	Great interest in radio. Government owns and operates the stations. A fee of \$4.87 required.
Surinam	0	no data.
Uruguay	27	Radio interest. Broadcaster supports.
Venezuela	3	Fee of 60 bolivers per year (\$11.58).

721,826

Europe

Nation	Stations	Sets	Information
Albania	1	3,512	No data.
Austria	6	439,332	Fee varies from 24-72 schillings (\$3.36-\$10.08) See Page 88.
Azores	0	25	Poor climate.
Belgium	11	69,437	Fee of 65 cents. Broad-caster supports.
Bulgaria	0	1,612	Broadcasting is discouraged by the government. Fee is \$1.44.
Czecho-slovakia	5	325,000	Monopoly. Good activity. Fee of \$3.60.
Danzig	1	16,000	Served by German stations and there is a fee of \$5.88.
Denmark	4	437,244	See Page 89.
Estonia	3	15,869	Peasant class predominates, so little development. Fee from \$2.40-\$4.00.
Finland	7	106,559	Hear many European programs. Fee is \$2.00.
France	30	2,000,000	See Page 89.
Germany	28	3,241,725	See Pages 86-87.
Gibraltar	0	150	Spanish programs are most popular. Fee of \$2.43.
Greece	0	1,500	Radio was restricted until 1926. The government is soon to take part. Fee is \$6.50.
Hungary	2	273,000	Fee is 45 cents per month. A monopoly.

Europe

Station	Stations	Sets	Information
Albania	1	12	No data.
Austria	6	489,332	Fee varies from \$4-V2 schilling (\$2.36-\$10.08) See Page 88.
Azores	0	25	Poor climate.
Belgium	11	69,437	Fee of 65 cents. Award - casser supports.
Bulgaria	0	1,612	Broadcasting is dis- couraged by the government. Fee is \$1.44.
Czechoslovakia	8	325,000	Monopoly. Good activity. Fee of \$3.60.
Denmark	1	16,000	Served by German stations and there is a fee of \$2.88.
Denmark	4	437,244	See Page 89.
Estonia	3	18,869	Peasant class predominates, no little development. Fee from \$2.40-\$4.00.
Finland	7	108,259	Many many European pro- grams. Fee is \$2.00.
France	30	2,000,000	See Page 89.
Germany	28	3,241,725	See Pages 86-87.
Gibraltar	0	150	Spanish programs are most popular. Fee of \$2.43.
Greece	0	1,500	Radio was restricted until 1936. The govern- ment is soon to take part. Fee is \$6.50.
Hungary	2	273,000	Fee is 45 cents per month. A monopoly.

Europe, continued

Nations	Stations	Sets	Information
Iceland	2	3,500	Population centralized. Government control.
Switzerland	6	100,000	
Irish Free States	2	26,000	Government monopoly. Fee of \$2.43 per year.
Italy	11	126,000	See Page 90. Fee is \$3.90.
Latvia	1	36,300	Fee is \$4.56. Government monopoly.
Lithuania	1	12,000	Fee is \$10.00 per year.
Luxemburg	1	2,000	No data.
Madiera	0	180	No data.
Malta	0	250	Installation fee - \$2.67 and sets fee of \$2.43.
Netherlands	7	253,527	Voluntary subscriptions.
Norway	13	60,000	One of the best radio developments in Europe. Fee of \$5.36.
Poland	6	230,000	Fee of \$3.36 per year. Monopoly.
Portugal	8	2,500	Tax, not a fee.
Rumania	1	40,000	Subscriptions of \$3.60 per year. Since 1929 the government has limited radio.
Spain	14	550,000	Allow advertising of 5-minutes per hour. Fee is 97 cents.
Sweden	32	460,750	Active interest, especially in education. Fee is \$2.60 in addition to installation fee of about \$10.72.

Nations	Stations	Rate	Information
Iceland	2	3,500	Population centralized. Government control.
Irish Free States	2	25,000	Government monopoly. Fee of \$2.43 per year.
Italy	11	125,000	See page 90. Fee is \$3.90.
Latvia	1	35,300	Fee is \$4.55. Govern- ment monopoly.
Lithuania	1	12,000	Fee is \$10.00 per year.
Luxembourg	1	2,000	No data.
Nadler	0	130	No data.
Netherlands	0	250	Installation fee - \$2.67 and rate fee of \$2.43.
Norway	7	223,327	Voluntary subscriptions.
Poland	13	50,000	One of the best radio developments in Europe. Fee of \$5.35.
Portugal	6	230,000	Fee of \$3.35 per year. monopoly.
Romania	8	2,500	Tax, not a fee.
Spain	1	40,000	Subscriptions of \$3.60 per year. Since 1929 the government has limited radio.
Sweden	14	250,000	Allow advertising of 5 minutes per hour. Fee is 97 cents.
	32	450,750	Active interest, especially in education. Fee is \$3.60 in addition to installation fee of about \$10.75.

Europe, continued

Nation	Stations	Sets	Information
Switzerland	6	100,000	Fee is \$3.00.
Turkey (Euro-Asia)	21	7,500	Fee is \$44.00. There is limited privilege for listeners.
Russia (Euro-Asia)	50 or 75	1,000,000	See Page 90.
United Kingdom	21	3,411,910	See Pages 77-85.
Yugoslavia	3	42,000	Only music is allowed to be broadcast. Fee is \$1.32.
		13, 292,097	
India	4	7,500	British control. Fee of \$3.00.
Iraq	0	50	Installation fee. Poor climate.
Japan	13	796,523	See Page 90.
Kwantung	1	3,910	Japanese regulations. Fee of \$0.45.
Manch	0	40	Heavily censored. Japanese program.
Netherlands East Indies	11	1,000	Just beginning to broadcast.
Paraguay	0	150	Heavily censored. No Asiatic program.
Peru	0	300	Low financial contribution.
Philippines	-	3,500	U.S. regulations.
Siam	6	3,043	Permits required. Fee of \$0.45.
Straits Settlements	2	550	Government monopoly.
Syria	0	150	Fee is \$0.45.
		849,313	

Europe, continued

Station	Stations	Tests	Information
Switzerland	8	100,000	Fee is \$3.00
Turkey (Euro-Asia)	2	7,500	Fee is \$44.00. There is limited privileges for listeners.
Russia (Euro-Asia)	75 or 75	1,000,000	See pages 77-85
United Kingdom	21	2,411,910	Only music is allowed to be broadcast. Fee is \$1.32.
Yugoslavia	3	42,000	

13, 222, 027

Asia

Nation	Stations	Sets	Information
Aden	0	10	No data.
Arabia	0	20	No data.
Ceylon	1	1,500	No data.
China	14	15,000	Broadcasters support.
Chosen	1	12,000	Limited by Japanese regulations. Fee, \$16.48.
French India	0	1,000	Fee 39 cents.
French Indo-China	4	25	Sets are limited to government officials.
Hong Kong	1	1,760	Fee is \$2.20. Government monopoly.
India	4	7,672	British control. Fee of \$3.65.
Iraq	0	50	Installation fee. Poor climate.
Japan	19	795,523	See Page 93.
Kwantung	1	3,910	Japanese regulations. Fee of \$6.48.
Macao	0	40	Hear both Chinese and Japanese programs.
Netherland East Indies	11	1,000	Just beginning to broadcast.
Palestine	0	150	Hear both European and Asiatic programs.
Persia	0	300	Low financial condition.
Phillipines	-	3,600	U.S. regulations.
Siam	6	5,043	Permits required. No fee.
Straits Settlements	2	550	Government monopoly.
Syria	0	150	Fee is 96 cents.

 849,313

Asia

Station	Stations	sets	Information
Aden	0	10	No data.
Arabia	0	20	No data.
Ceylon	1	1,500	No data.
China	14	15,000	Broadcasters support.
Chosen	1	12,000	Limited by Japanese regulations. Fee, \$16.48.
French India	0	1,000	Fee 32 cents.
French Indo-China	4	25	sets are limited to Government officials.
Hong Kong	1	1,750	Fee is \$2.20. Government monopoly.
India	4	7,575	British control. Fee of \$3.65.
Iraq	0	20	Installation fee. Poor climate.
Japan	19	795,523	See Page 93.
Kwantung	1	2,910	Japanese regulations. Fee of \$8.48.
Macao	0	40	Hear both Chinese and Japanese programs.
Netherlands East Indies	11	1,000	Just beginning to broadcast.
Palestine	0	150	Hear both European and Asiatic programs.
Peru	0	300	Low financial condition.
Philippines	-	3,600	U.S. regulations.
Siam	5	5,043	Permits required. No fee.
Straits Settlements	2	250	Government monopoly.
Syria	0	150	Fee is 36 cents.
		849,313	

Africa

Nation	Stations	Sets	Information
Algeria	2	10,000	Fee of 10 francs.
Angola	1	100	No data.
Basutoland	0	15	Reception is limited to Union of S. Africa.
Bechuanaland	0	15	No data. Probably limited to use of white people.
Belgian Congo	0	12	No data.
British Somali-land	0	8	No data.
British West Indies	0	75	No data.
Canary I.	2	200	Fee 97 cents.
Egypt	3	500	Independent ownership but government prohibits.
Ethiopia	2	2	Lowest development of world.
Fr. Equitorial Africa	0	500	Fee is 39 cents.
Fr. Morocco	6	3,000	Used as contact with Europe.
Italian Africa	0	250	No data.
Kenya	1	500	No data.
Liberia	0	5	No data.
Madagascar	1	150	Fee is 39 cents.
Mozambique	0	100	No data.
N. Rhodesia	0	50	No data.
S. Rhodesia	0	150	Fee according to nearness to station.
S.W. Africa	0	50	No data.

Africa

Station	Stations	Rate	Information
Algeria	2	10,000	Fee of 10 francs.
Angola	1	100	No data.
Assutoland	0	15	Reception is limited to Union of S. Africa.
Bushmanland	0	15	No data. probably limited to use of white people.
Belgian Congo	0	15	No data.
British Somaliland	0	8	No data.
British West Indies	0	75	No data.
Cannary I.	2	200	Fee 27 cents.
Egypt	2	200	Independent ownership but government prohibited.
Ethiopia	2	2	Lowest development of world.
Fr. Equatorial Africa	0	200	Fee is 39 cents.
Fr. Morocco	6	3,000	Used as contact with Europe.
Italian Africa	0	250	No data.
Kenya	1	200	No data.
Liberia	0	2	No data.
Madagascar	1	150	Fee is 39 cents.
Mozambique	0	100	No data.
N. Rhodesia	0	50	No data.
S. Rhodesia	0	150	Fee according to nearest station.
S.W. Africa	0	50	No data.

Africa, continued

Station	Stations	Info	Information
Spanish Africa	0	150	Fee is 27 cents
Swaziland	0	15	no data
Tanganyika	0	10	No data
Tunisia	3	4,500	Fee is 20 francs per year. Foot reception.
Union of S. Africa	3	25,121	See Page 94
Zanzibar	0	5	No data
		45,483	

Oceania

Nation	Stations	Sets	Information
Am. Samoa	1	30	U.S. regulations.
Australia	50	329,134	See Page 94.
British Oceania	1	250	No fee. Poor climate.
Fr. Oceania	0	50	Fee is 39 cents.
Guam	-	12	U.S. Navy regulations.
Hawaii	2	15,500	U.S. Regulations.
New Zealand	35	61,449	Fee is \$7.50 per year. Among the first to use radio.
Fiji	1	--	No data.

 406,425

Station	Watts	Information
Am. Samoa	1	U.S. regulations
Australia	50	See Page 94
British Oceania	1	No fee. Poor climate
Fr. Oceania	0	Fee is 39 cents
Guam	-	U.S. Navy regulations
Hawaii	2	U.S. Regulations
New Zealand	35	Fee is \$7.50 per year. Among the first to use radio.
Fiji	1	no data

 408,425

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